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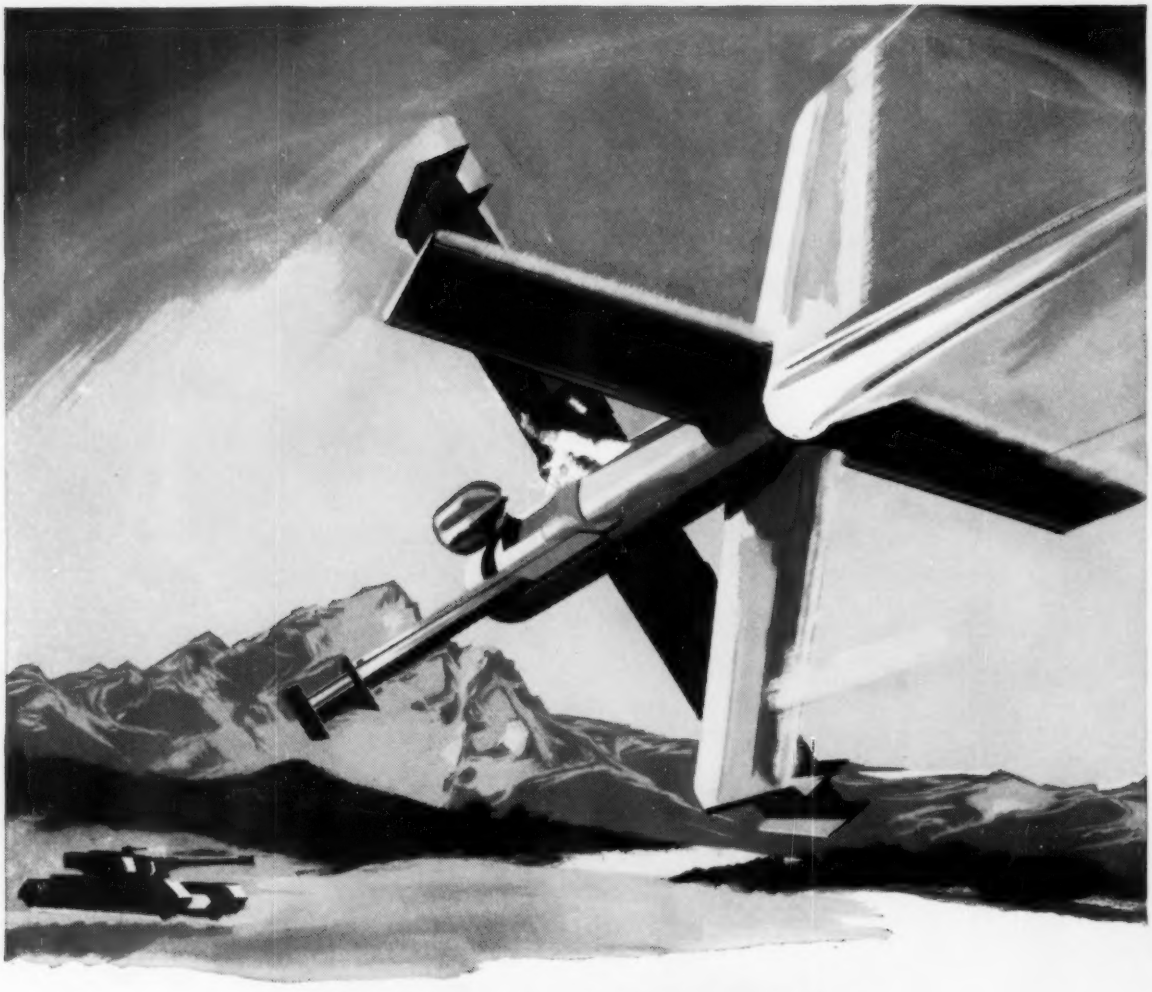

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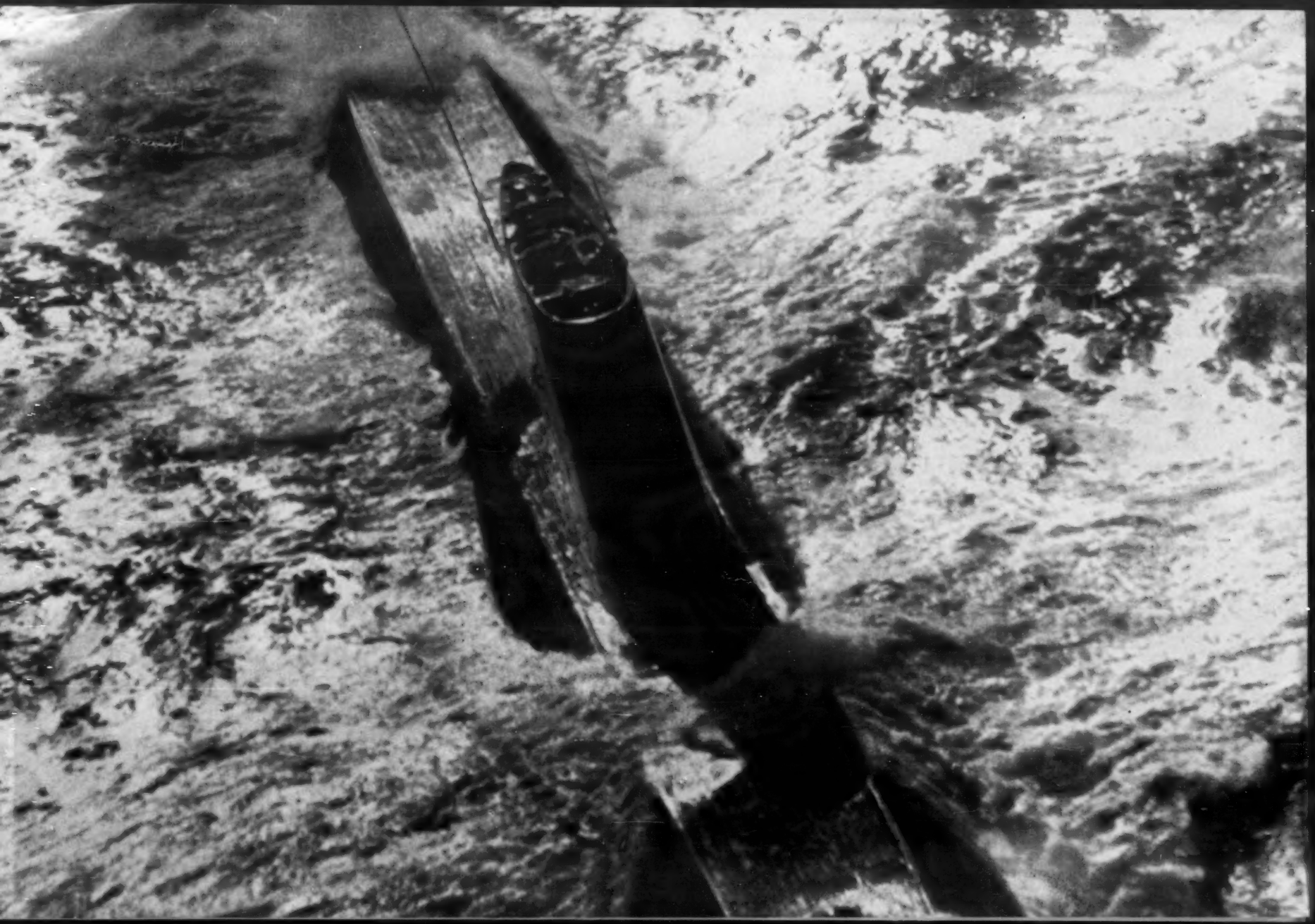

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ARMY

magazine of the **ASSOCIATION OF THE UNITED STATES ARMY**

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THE MONTH'S COVER

The flag of the Army which he served for forty-one years was presented to Old Soldier Dwight D. Eisenhower, President of the United States, by Secretary of the Army Wilber M. Brucker in the presence of General Maxwell D. Taylor, Chief of Staff of the Army, and Secretary of Defense Charles E. Wilson, at ceremonies in front of the White House on 10 July. Eleven of the 145 battle streamers on the flag were won by forces commanded by former General of the Army Eisenhower during the Second World War. *(U. S. Army Signal Corps photo.)*

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THE MONTH'S MAIL

Comments on Regimental System

• For some time I have been meaning to comment on the article "Long Live the Regiment," by Colonel Elmer Schmierer in the April issue of *ARMY*. I have been finally driven to do so, so to speak, by the news from London that some of the famous old British regiments are to be merged in connection with the reduction of the British armed forces and by certain parts of General Booth's article in the August issue of *Army Information Digest*.

I was a member of the so-called "Section Five Committee" before whom Colonel Schmierer presented the outline of the regimental system some months ago. I believe in the use of the system for the U.S. Army, and the comments I make here are intended to be of an entirely constructive nature.

My most important criticism is that I believe the list of parent regiments is too long. As I write, the U. S. Army has seventeen divisions, of which two are in Korea and five in Germany. I think it entirely reasonable to assume that these seven divisions will be brought home, so to speak, within the next generation and that the Army will accordingly be reduced to not more than ten divisions. While I would not pretend to believe that the present Pentomic organization will continue unmodified, for present purposes I think we can assume that each division will have not more than five infantry battle groups and not more than two field artillery battalions. This would give us in the foreseeable future only fifty battle groups in divisions and only twenty field artillery battalions. Admittedly, there will be nondivisional troops of both these arms but, nevertheless, it appears that the number of parent regiments now provided is too large, both in infantry and field artillery.

My second criticism is that regiments are classified too narrowly. I particularly object to airborne infantry, armored infantry, and infantry. This regimental system we are adopting is supposed to last indefinitely and certainly it is not at all beyond the realm of possibility that the parachute as a means of entering battle will be supplanted by new developments in aircraft. It is also perfectly possible that the distinction between armored infantry and ordinary infantry will die. I would like to see some regiments contain both airborne and ordinary battalions. The list on pages 28 and 29 of the August *Army Information Digest* indicates a similar overclassification of armored and artillery units.

I have two other criticisms which are possibly less important and which probably do not pertain directly to the regimental system as such. One of these is the arrangement under which an infantry battle group is commanded only by a colonel. This means that there is no combat command for either a major or a lieutenant colonel of infantry and that the professional soldier must spend these important middle years of his career on staff assignments without command responsibilities to develop him. I believe that only the first battle group of each regiment should be commanded by a colonel and that all others should be commanded by lieutenant colonels. It might be desirable to make the command of a headquarters company of a battle group a job for a major.

Finally, I object to the name *battle group*. The so-called battle groups very closely resemble battalions, and I think that title should be used.

MAJ. GEN. JOHN W. MORGAN
USAR, RETD.
65 E. 55 St.
New York 22, N. Y.

Strength Through Reduction

• From occasional news items it appears that someone in Washington read the article [September 1955] on the Von Krankheit system of force reduction and defense strengthening and has taken its logical views to heart. Each time a number of men is dropped from the service, it is also stated that due to this or that advance—like the adoption of a new rifle, of which ample supplies are on hand for one platoon of a mobile force, or the invention of a new personnel carrier, present in mock-up form (plywood armor and plastic cannon barrel)—the effective striking power of the force reduced is thus raised to x times what it would be with its old set-up.

Mathematics is an exact science. By the careful application of the factor known as Finagle's Constant it is made crystal clear that as the numbers of men go down and the numbers of the new fighting machines increase, a state is some day to be reached where the armed forces of the U.S. will consist of one man and will also be irresistibly strong.

The fault with our past use of the reduce-and-beef-up system has been that we have failed to inform the hordes behind the Iron Curtain of the true meaning of our set-up. They think that because we are phasing out the weak, fallible, human element we are losing power. We should make it clear that as our forces drop in size from x (insert current force level at press date) divisions to the size of a Resistless Regiment, then to a Power-Packed Platoon, and finally to a Smashing Squad, and lastly to a single Superman Soldier, our deterrent power will equal all they have. We should turn to the advertising geniuses who have been proving for years that the engine using more gas is really the more economical, and the others who insist that their brand of beer is dry and at the same time a liquid, and let them belabor the Muscovites about the sconce with facts and figures they cannot contradict.

In time we shall be able to use the system advocated by Von Krankheit wherein the inerted members of the service repose in their vaults where neither moth nor rust doth corrupt awaiting the call like Holger Danske under Kronborg Castle. And then we can rest upon our typewriters and defy all the unwashed hordes to do their damnedest. But it seems to me that somewhere there lies a defect. Perhaps the tactical and strategic experts among *ARMY* readers can analyze this system and point out its flaws in clear language.

Yours for a one-man army.

SGT. VON LACKWITZ

Why Men Fight

• Reference: "Nothing New—Under The Sun" by Brigadier General S. L. A. Marshall, in July issue of *ARMY*.

General Marshall says ". . . I reject totally the idea that the extraordinary élan of that [Israeli], or any other army, may come from self-identification of the individual with the goals of his nation in the hour when his life is in danger."

True, the effect of nationalism . . . be it Democracy, National Socialism, or Communism, is perhaps minimized when the soldier feels the personal impact of the battlefield, but to totally reject this idea is at least partially wrong.

"A personal code of honor, of bound obligation to his friends, of fear of failure in their sight and of final disgrace" enters into the picture, to be sure, but what of unit esprit? Is this not intense nationalism on a smaller scale? Most of

us are not the flag-waving type, nor have we ever been, but a healthy personality pushes the "self" into a back seat occasionally, and a combat situation is no exception.

And what of heterogeneous forces thrown together by necessity? Is nowhere in the individual and group makeup to be found a spark of nationalism? . . . the sense of camaraderie is certainly missing here and what great worry is failure in the face of strangers? If such a group succeeds, it is said they are the exception, but are they really?

My point is this: the individual and group makeup are complicated affairs; as the individual is a product of all his learning, so the group is neither more nor less than the sum of its members. To try and develop quick rules of thumb to fit the human element is not only erroneous, but could be (and has been) disastrous.

LIEUTENANT, INFANTRY

Changes in Artillery Insignia

● One answer to Major Hime's question and criticism of the new artillery insignia [page 4, June] might be: Change can sometimes mean progress. Missiles like the Congreve and Hale rockets and improvements on them were used by U.S. Artillery in the nineteenth century. At last their modern versions will be a part of the Artillery's trade mark—the fifth in its history.

The first insignia was the Light Artillery Regiment's LA on cap plates and uniform buttons during the years 1808 to 1821. Next came the unadorned crossed cannon adopted in the 1830s. This basic design has never been abandoned, although it has varied in minor details, size and adornment.

The third design, like the fourth and fifth, was a variation used for a few years early in the twentieth century by mobile batteries of Artillery regiments. At the center of the crossed cannon was superimposed an oval on whose red face was a gilt wheel in outline. This attachment went out in 1907 when the Field Artillery became a separate arm. The other segment of the U.S. Artillery became the Coast Artillery Corps.

CAC got the fourth form of the Artillery insignia: crossed cannon with oval at center, on whose red face was a projectile. After World War II the seacoast function of the CAC almost vanished while the AA role, allotted to it in World War I, became its primary mission. The CAC was redesignated Antiaircraft Artillery in 1947. The AAA continued to wear the CAC insignia until 1950, when all became Artillery again and were directed to wear the old Artillery insignia.

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that arm probably will always retain such basic trade marks as crossed cannon, and red and yellow on flags, guidons and uniforms.

LT. COL. WILLARD L. JONES
OCMH
Washington 25, D. C.

Mortar Subcaliber Device

● As S. L. A. Marshall says in the July issue, "Nothing New—Under the Sun." And so, when I read "Thrifty Tom" on page 68 of the same issue, I agree with him—nothing new.

A device of this type had been designed and was being demonstrated by the Infantry Board, when I was assigned to it in 1942. I'm a little hazy about the exact background, but I think it was the brain child of H. G. Sydenham, now a retired colonel and living in Florida. Syd had more ideas than anyone could count, and this probably was one of his. At the same time, William S. Triplet, also now a retired colonel, was with the Board. Bill had just as many ideas, as readers of "Terry Bull" will remember.

Regardless of where it came from, this subcaliber rig was shown at many large demonstrations. I demonstrated it many times myself.

I don't want to detract from Major Reidenbaugh's credit, because it probably was an original idea with him. In any event, it was a useful device. If you are interested, I suppose one of the early Board reports would cover this item, and might indicate some improvement.

COL. EDWARD B. CROSSMAN
Aberdeen PG, Md.

Bazooka Tester

● "Irons in the Fire" in the June issue describes a bazooka tester invented by SFC Dale A. Rivers. I invented a similar tester while at Fort Hood, Texas, and was given first place award in the monthly suggestion contest in November 1956. The tester consisted of a flashlight bulb with two pieces of field wire attached by solder. The other ends of the wire were attached to alligator clips—one fastened to a contact point, the other to an electrical terminal. My suggestion was rejected by Fourth Army because "less than the proper amount of current needed to fire the rocket would fire the light."

However, my unit used this device on the 3.5 rocket launcher range on several occasions, and it never failed to point out the defective launchers. This device saved us many hours of work.

LT. HENRY W. MEETZE
Fort Rucker, Ala.

Responsibility and Grades

● "Give the Corporal Back His Squad," by Colonel Juskalian [May] brings to the fore once again the old problem of how to distribute rank and authority.

Colonel Juskalian speaks of the "good old days" (if there was such a time) when every outfit had but a handful of high-ranking noncommissioned officers who were walking encyclopedias of Army customs and regulations as compared with the present overstaffing of the top noncommissioned officer positions and the lowering of prestige in the bottom five grades. To solve this problem he suggests we knock everyone down a few notches and once again establish the system of rank that prevailed before World War II.

While such a move has many sound points it would increase the gap between the noncommissioned and the commissioned officer, with the result that a caste system would again become pronounced as it was in the past. Such a move would be bad, since many competent noncommissioned officers would be held in lower rank and there would be little room for advancement. Young men who might otherwise make good noncommissioned officers will be reluctant to remain in the Army because of the low social position the noncommissioned officer would hold. Many fine noncommissioned officers—good potential officer material—would be held in the ranks, maybe serving under men inferior in every way except rank, because of the resulting difficulty in advancing from noncommissioned to commissioned grade.

Of course, there can be no clear-cut solution to the question of rank distribution, but one possible move is to take those men who would rate E-8 or E-9 and make them second lieutenants. This would result in breaking down the gap that exists today between commissioned and noncommissioned officer. The service would obtain better men since they would be able to rise as high as their ability enables them and not be chained down by a caste system of rank. The Army would get a better officer corps since it would draw a larger percentage of its young officers from experienced and capable noncommissioned officers instead of from other sources.

At present some steps have been taken to enable outstanding noncommissioned officers to obtain commissions, such as OCS. But we still have too many good potential officers in the ranks and maybe too many men wearing officer insignia who can't measure up to the standards of what a good officer should be.

LT. ALLAN FELSEN
Pershing Rifles
Hofstra College, NY

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FRONT AND CENTER

$220 Million

The full impact of the mandatory reductions in Army strength and activities ordered in July and August couldn't be fully assessed as this issue went to press, but it was clear that rocky days lie ahead. Army spending in this fiscal year will be at least $220 million less than anticipated. In contrast the Air Force is scheduled to spend $300 million more than originally planned and the Navy $11 million more.

Total Army expenditures in Fiscal 1958 will be an estimated $8,950 million as compared with a January estimate of $9,170 million. Air Force spending will total $17,900 million, and the Navy will spend $10,400 million.

The big item to the Army is the separation of 5,530 officers and 44,470 enlisted men by the end of the year. This will obviously impair the Army's operational capabilities and a sign post on the way to reduced capabilities is the announced elimination of the 24th Infantry Division in the Far East. The effect on the reorganization of the Army's combat divisions into Pentomic divisions remains to be seen.

The only possible ray of sunlight in the prospect is the opportunity it gives the Army to discharge ineffective draftees who are unable to perform the duties demanded of private soldiers in a modern army. The Army has been required to accept these men and train them even though their ineffectiveness became apparent early in basic training.

Officers who had been scheduled for separation during the last half of Fiscal Year 1958 will be released in November, as will be some 1,500 officers from colonel through captain who are named by an Army board. All officers designated for release will be notified by 15 November and most by 15 October.

Hearings on Cordiner Program

As was mentioned in last month's issue, a sub-committee of the Senate Armed Services Committee plans to begin exhaustive hearings on the Cordiner pay program in the near future. Senator John C. Stennis, who is chairman of the sub-committee, announced that the opening of the hearings would depend in part upon when he received an answer to 59 detailed questions on the program which he had sent to Mr. Wilson. He emphasized that the hearings would not be perfunctory and would dig into all aspects of the program including the Administration's position that fiscal considerations dictated its opposition to it.

Second Army Reorganized

To replace eight military districts within the area of Second Army two administrative-type corps are being acti-

MAJ. GEN. HARRY P. STORKE who will become Chief of Information and Chief of Public Information on 1 Oct 1957

MAJ. GEN. SAM C. RUSSELL new commandant of U. S. Army Air Defense School and Center, Fort Bliss, Texas

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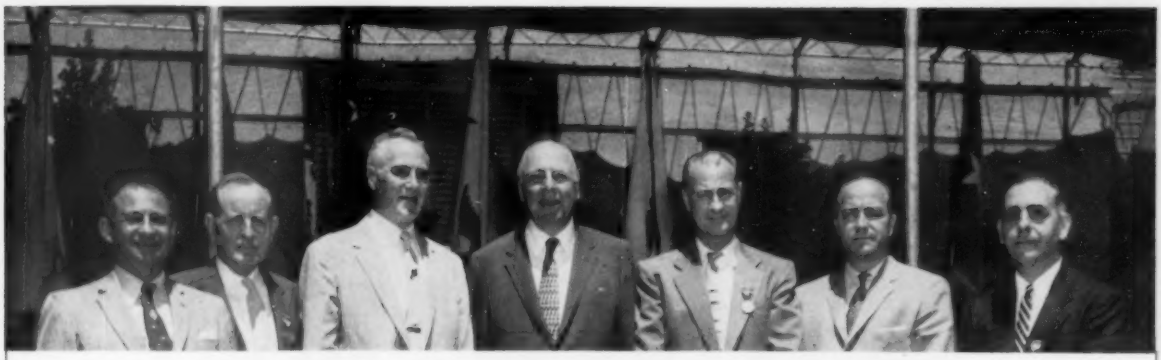
Governors Island, N. Y. Maj. Gen. Robert H. Booth, Chief of Staff, First U. .S Army, is shown a travel display on a newly refurbished recruiting bus at Fort Jay, by Col. Frederick Streicher, Chief of Military Personnel Procurement



Mr. Abramson, Mr. Hough, Mr. Jasin, Secretary Brucker, Mr. Brown, Mr. Danko, and Mr. O'Hehir

SECRETARY BRUCKER HONORS SIX ARMY CIVILIAN EMPLOYEES

Exceptional civilian service awards and cash awards, including a record sum of $10,000 were given to six Department of the Army civilian employees by Secretary of the Army Wilber M. Brucker at a Pentagon ceremony on 10 July.

The ceremony provided special recognition and cash awards to individuals for suggestions accepted by the Department of the Army and put into use to effect improved methods of operation, better management, substantial savings and increased productivity.

Stanislaus F. Danko and Moe Abramson, both employed at the Signal Corps Engineering Laboratory, Fort Monmouth, received a joint cash award of $10,000, the highest amount ever presented to civilian employees of the Department of the Army. Mr. Danko and Mr. Abramson developed a process of automation known as "Auto-Sembly" which it is estimated will save the government $4,200,000 in the first year of operation.

Theodore E. Jasin, employed at Ravenna Arsenal, Apco, Ohio, an Army Ordnance Corps installation, received a cash award amounting to $1,275 for a suggestion concerning a change in freight classification which resulted in a saving to the government of $1,055,000.

Exceptional Civilian Service Awards were presented to:

Edward L. Brown, Chief of Explosives Unit, Picatinny Arsenal, Dover, N. J., for his exceptional performance beyond the call of duty. On 6 September 1956, Mr. Brown voluntarily risked his personal safety in entering an explosion-wracked, fume-filled building to find a missing fellow employee and to successfully drown two explosive charges dangerously near detonation.

John P. O'Hehir, for performance of duty as comptroller, Rocky Mountain Arsenal, Denver, Colo., from 1 July 1951 to 31 December 1956. His outstanding accomplishments in converting from the Appropriation Accounting System to the Army Industrial Funding System, resulted in most effective utilization of government resources.

Floyd W. Hough, for performance of duty as Chief Geodetic Engineer, Army Map Service, Corps of Engineers, from 5 March 1946 to 31 December 1956. His achievements in arranging for a unified world-wide geodetic system have resulted in the development of an accurate and more simple means of fixation of the location of features of the earth's surface.

vated. A field test designed to improve USAR training by assigning responsibility to an Active Army unit is being created specifically for the purpose. Non-Reserve operations ordinarily will not be delegated to these new corps headquarters (Reserve) or their elements, though additional supervisory duties for the ROTC also may be assigned by the army commander.

The consolidation is planned to reduce the number of major headquarters, thus simplifying operation and control. A reduction in personnel should result by consolidating headquarters and by assigning supply and logistics functions to army headquarters and Active Army installations, whenever possible. Civilian employees affected by the reorganization will be accorded full reassignment rights under current personnel regulations.

As far as possible, facilities and locations for the corps headquarters (Reserve) will be established at existing military installations. The two corps being activated are: XX Corps (Reserve) commanded by Maj. Gen. Martin J. Morin, at Fort Hayes, Ohio, which will train, administer and support USAR elements in Ohio, West Virginia and Kentucky; XXI Corps (Reserve), commanded by Maj. Gen. Herbert J. Vander Heide, at Indiantown Gap Military Reservation, Penna., which will do the same for Pennsylvania, Maryland, Delaware, Virginia, and the District of Columbia.

Reserve Training a Success

The National Security Training Commission, in its report to the President, said that the Reserve training program is a success, and that the Nation approaches the most effective force in its history. On its own recommendation, the Commission, headed by Brig. Gen. David Sarnoff, USAR, President of RCA, ended its work on 30 June.

While it was satisfied with the existing program, the Commission warned that "it would be a grave mistake if the reserve program were permitted to lag because of lack of funds or for any other reason."

General Sarnoff's group noted that a year ago, enlistments for the six-month training program for reservists, originally recommended by it, were averaging about a thousand a week. By April 1957 enlistments had risen to more than 4,000 a week. The rush of young men to join the program was so great that enlistments had to be suspended for ten weeks.

Until last February, the Commission

Four young San Francisco area boys who let the Army know that they intend to make the Army a career got the full VIP treatment in tours of the Army's Terminal Center and Command at Fort Mason, Headquarters Sixth Army at the Presidio of San Francisco, and the antiaircraft Nike Battery at Fort Funston. At the latter visit they donned the protective clothing worn by missilemen when fueling the Nike and imagined themselves space-soldiers of 1967. Their admirer is Lieutenant Leonard Allen, Battery A, 740th AAA Missile Battalion.

believed there were inequities in military training and service, but since then it became satisfied that changes had been made. "We must continue to train increasing numbers of men," the report said, and to "those who mistakenly believe that pushbutton warfare has pushed the GI [sic] out of the picture," it aimed the question, "What good would all of our new super weapons be without trained men to operate them?"

The report is a challenge to the regular services, which must train the reserve components, as well as a challenge to the whole program to prove it can provide the needed number of really trained men who can be used quickly and effectively in an emergency.

New Items in the PX

After hearing arguments of spokesmen for the services and for national retail associations, the House Armed Services Committee, headed by Representative Philip J. Philbin of Massachusetts, approved additional articles that may be sold in post exchanges, set new price limitations on certain articles, but turned down a proposed trial credit plan. The Committee warned that there must be continued "restraint in the scope of exchange operations," and that the services must be "ever mindful that the primary mission of the exchange is to provide a service, not to generate a profit."

While the Committee turned down men's sport coats and automobile tires, male members of the family can now get better power tools, lawn mowers, car accessories, military cuff links and white shirts. The Committee ruled that sport coats do not meet the standard of "necessity and convenience," and turned down tires because all cars normally carry a spare, and their sale would require additional services like mounting and wheel-balancing which the PX should not provide. Portable typewriters and batteries can be sold—batteries because they are "emergency" articles, and "there is no such thing as a spare battery."

New price ceilings allow wives to buy better-quality fans, coffee makers, vacuum cleaners, carpet sweepers, ironing boards, clothes dryers, kitchen stools, electric mixers and flatware. For the first time they can get baby furniture, maternity dresses and children's clothing, with ceiling prices on maternity brassieres, girdles and garter belts removed. The Committee established this list, with price limitations: Car seats ($5), safety gates ($6), bassinets and car beds ($12), high chairs, mattresses and play pens ($15), strollers, baby baths and cribs ($20), baby buggies and juvenile chests of drawers ($25). It recognized that many additional items of baby furniture are "highly desirable" but do not meet the standard of "necessity and convenience" which would authorize their inclusion.

Here is the approved list, with ceiling prices:

New items: portable typewriters ($75), maternity dresses, baby furniture.

Expanded classes: children's clothing (sizes 7 to 12), electric blankets, batteries.

Price ceiling eliminated: military cuff links, maternity brassieres, garter belts and girdles.

New price ceiling limits: white shirts ($2.50), watch straps ($5), kitchen stools, carpet sweepers, clothes dryers, auto accessories, ironing boards ($10), dinnerware, but excluding china, earthenware and plastics ($25), mixers, vacuum cleaners, fans, coffee makers ($30), flatware, 34 pieces with chest ($35), record players, cameras, power tools, lawn mowers, transistor radios, projectors, photo accessories ($50).

The trial credit system was disapproved because the Committee agreed with retail groups that such a step would be "an expensive undertaking" and would "constitute the worst type of competition with the retail industry."

Housing Criteria

In an effort to assure adequate permanent housing for the long-range Army, the Department of the Army has directed the submission of a special one-time report on housing from each permanent Army installation. Housing requirements will be determined by equating current strength and housing with predicted strength, on a basis of past experience.

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MSgt. Robert E. Christensen, Hq. & Hq. Co., 3d Army Missile Command, opens the door to new living for himself, Mrs. Christensen, and sons, David and Andy, in the presence of Assistant Secretary of the Army Dewey Short. These are the first quarters to be occupied in Fort Bragg's new Capehart Housing Project.

Army policy is to make maximum possible use of existing civilian housing, so it has furnished commanders with criteria by which to judge the adequacy of such housing in preparing their report. Civilian housing units may be considered inadequate or substandard if:

They lack essential utilities.

They lack an individual kitchen or an inside bathroom.

They do not meet suitable standards of construction or design, being too small, or having unfinished outer walls, unlined interior walls, unfinished floors, or are not reasonably weather- and water-tight or are not structurally safe. Also in this category are houses so poorly designed that they require direct access from the living or dining room into the bathroom, or access to bedrooms through other bedrooms or the kitchen, or with the main entry through the kitchen or a bedroom.

They are located outside a reasonable commuting range (thirty minutes one way; for AA tactical sites, ten minutes), or in unsuitable or unhealthy areas, near sewers, disposal plants, dumps, swamps, railroads or in heavy industrial neighborhoods.

Their rent plus utilities exceed the rental allowance.

These criteria are for general guidance only and may be modified to meet local conditions. However, states the Department of the Army, the evaluation must be made with extreme care and must be able to withstand the closest scrutiny.

Bonn Command Academy

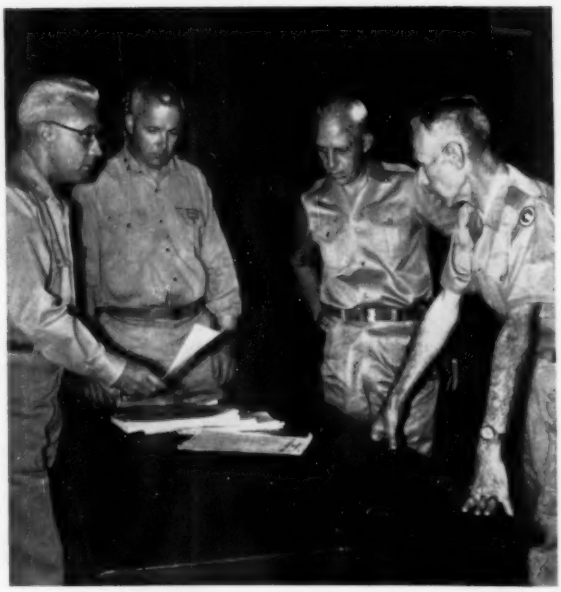
West Germany recently opened its Führungsakademie (Command Academy) at Bad Ems to the first class of 80 captains, majors and colonels, drawn from the top layer of talent available. Most were career officers with company and battalion assignments in World War II. Thirty-five earned combat decorations and thirty-one have academic degrees. About one-third will get staff jobs in the Defense Ministry after graduation in October; the rest will go to field units as staff officers or troop commanders.

Main intellectual influence is the U. S. Army's Command and General Staff College, whose training methods and strategic and tactical concepts were imported. Several of sixteen instructors and six of the students attended Leavenworth as guests.

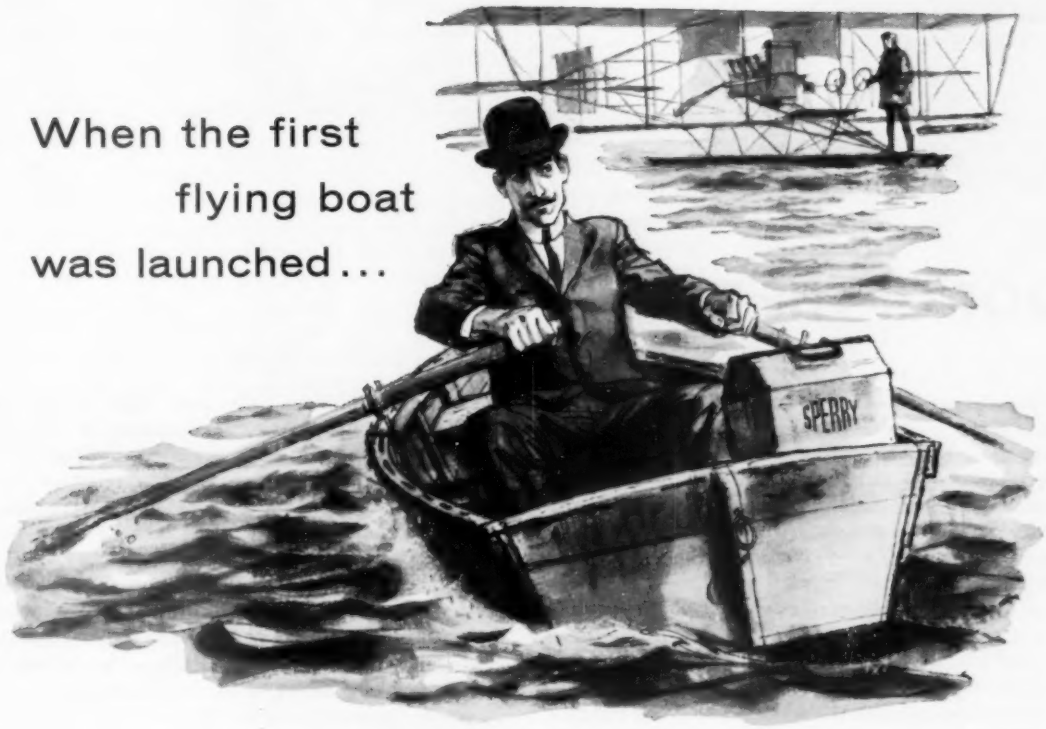
The school's equipment is not yet complete, and the curriculum has not been fully established. This course will run six months instead of the one year planned for the future. West German officers consider it only a starter in rebuilding a military force that will earn the respect of high commanders of other powers. They look to the day when the

(Continued on page 56)

At Fort Bragg, N. C., Col. Lawrence G. Treece *(left)* Control Officer, 322d Logistical Command, briefs Maj. Gen. Daniel J. Manning, his commanding general; Brig. Gen. Marshall Stubbs, new commander of the 1st Logistical Command; and Brig. Gen. Alvin G. Viney, outgoing commander of the 1st Logistical Command. The 322d is a Chicago USAR unit which recently completed its summer training at Fort Bragg reservation.



When the first flying boat was launched...



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already trained to instruct pilots in its proper use, provide expert maintenance, and make repairs as required.

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Sea Captains soon found that in any part of the world Sperry engineers were always close at hand–ready to adjust or service the Gyro-Compass and Gyropilot*, and later on, Sperry Loran, Radar and Gyrofin* ship stabilizers.

With development of world-wide aviation, airlines and military agencies found Sperry facilities available abroad providing prompt service on flight control systems and all forms of Sperry instrumentation.

In World War II and the years that followed, Sperry still further extended field engineering to every branch of the military, from the tropics to the arctic regions – servicing intricate bombing, gunfire control, and missile systems, keeping radar and other electronic gear in prime condition.

Today there are more than 900 Field Service Engineering personnel assigned to Sperry products in three major areas –service, training and product repair. Supporting each of these services are specialized product engineering staffs. Through this concentrated team effort, customers are assured that they receive the full value engineered into every Sperry product or system. *T.M.

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EDITORIAL

ROOT OF THE EVIL

THE witticism that has it that "money isn't the most important thing in life but is several lengths in front of whatever is in second place" is cruelly descriptive of the actions taken during this summer, in matters of military defense. The implementation and continuation of programs that would give muscle to the military elements of national strategy are running a poor second to financial considerations.

There are several indications of this:

Item. Confusion developed in Congress, in the news media, and among the general public over the 1958 military budget. Opposition representatives and senators maintained with some logic that the administration was reducing what it had previously characterized as a "minimum budget" and a "peril point" budget. Their attitude may have been based on an assertion by the President in an address to the nation on 14 May that, "if it [the military budget] is materially cut I believe the country would be taking a needless gamble."

Item. Hardly had the new Fiscal Year began than the Department of Defense imposed arbitrary reductions in force levels and a stretchout in military spending on maintenance and operations. Soon thereafter Mr. Wilson announced that these savings would be insufficient and more cuts in manpower and spending would be necessary. They weren't long delayed. In early August, as it became clear that the rate of spending by the services would push the total for the fiscal year above $38 billion, further cuts were ordered. But in a reversal of the American idea that thrift should be rewarded, the Army, which was spending substantially below its allotted rate, was required to make further reductions in order to stay within the ceiling.

Item. Mr. Wilson announced that a monetary ceiling of $38 billion would be placed upon the JCS in its consideration of the 1959 budget. That such a ceiling might be unrealistic in view of the rising costs of military hardware (present rate estimated at five per cent per annum) and that it might be unwise because of its effect on the U. S. position in the world and its ability to carry out its commitments, are obvious; but it is also worth noting that this is the first time a dollar ceiling has been imposed publicly on the Joint Chiefs in their consideration of the defense need of the nation. Admittedly this isn't the whole story, since as a practical matter the JCS has always known that a ceiling existed even though they weren't formally told what it was and were not told to let such a figure influence their thinking. It is more than a straw in the wind that blows from the direction of the Bureau of the Budget that, in advance of its consideration of the 1959 budget, the JCS is told in effect not to submit any programs that would raise defense spending beyond $38 billion, no matter how urgent the JCS might believe such a program to be.

Item. It cannot escape the notice of the Russians that the U. S. is proceeding with a certain degree of unilateral disarmament despite the lack of agreement by the disarmament negotiators in London. Perhaps the Soviets reason that if they talk long enough they'll get substantially all they want without having to make any concessions of their own.

THE most important effect of the placing of fiscal considerations ahead of military muscle is deserving of more than insertion in a bill of particulars. When money dictates the requirements of military defense, the heart of national security is affected. And yet that is what has happened during this summer of 1957.

Cabinet members seldom publicly express high policy until after the policy is well established. For this reason the evidence that our policy makers have come to a reassessment of politico-military strategy is less than clear cut. Yet such evidence exists and in such ways as to enforce respect. *The New York Times* commented editorially on 13 August that a "new alternative [to massive retaliation] strategy has been approved by both President Eisenhower and the National Security Council, and the whole military set-up is now being adjusted accordingly." In a series of articles, Chalmers Roberts, the highly respected State Department correspondent of *The Washington Post & Times-Herald*, wrote on 12 August:

"From the State Department's point of view, the task ahead is to get the Pentagon [meaning the Department of Defense] to understand the necessity of creating military forces related to the tasks which diplomacy, or failure of diplomacy, may assign it. This means not only the continuation of the big deterrent but also an ability to fight the so-called small wars and the recognition that limited war is not only possible but under various circumstances is essential in the national interest."

One need not debate the area of difference between the *Times'* hopeful view that the military forces are be-

ing adjusted to the new policy and Mr. Roberts's intimation that the Department of Defense (and possibly the Bureau of the Budget?) is not in complete agreement with the State Department. The difference is one of degree. The *Times* seems to be thinking of the possibilities of small tactical weapons and such tactical organizations as Army Missile Commands and Pentomic divisions. Mr. Roberts, reflecting State Department thinking, isn't inclined to count such weapons and units as an aid to diplomacy until they are deployable.

IT is interesting to note how this new strategy conforms to the politico-military policies advocated by the Army, principally by Generals Ridgway and Taylor. In all logic the best way to implement such a decision would be to adopt the several priorities of deterrence General Taylor has long advocated. Simplified these are:

Priority 1. A force that would prevent a general nuclear war. This would consist mostly of global aircraft carrying megaton-size bombs.

Priority 2. A force that would prevent a small or local war. This would consist of modern, highly-trained ground units stationed overseas as "shield forces" and backed up by ready and alert mobile Strategic Army Forces in the U. S. An important adjunct of this force would be sufficient air and sea lift to move these forces anywhere in the world in a very short time.

Priority 3. Military forces to suppress and win a small war if it breaks out. This would be a keeping up of Priority 2 forces to provide reinforcements and additional fire support and logistical forces.

Priority 4. This would include all of the residual requirements for fighting a general nuclear war.

The chief enemy of fresh approach to the make-up of our military forces is the status quo. As has been indicated above, such a new examination will require a searching scrutiny of all of the services and all forms of deterrence. The money allotted to the Army will not permit adding additional Army requirements, critical as they are, to present programs.

A basic policy in the establishment of forces under each priority should be "enough but no more." This will require the most careful reexamination of the present balance of our forces by the Joint Chiefs of Staff and the Secretary of Defense and the establishment of minimum requirements for each priority. Herein is the possibility of achieving an appropriate fiscal balance and at the same time improving our politico-military posture.

Real savings can accrue through the reduction of forces and weapons that will serve no useful purpose in achieving the first three priorities and those forces that are overbuilt beyond minimum requirements. To assure that it was allotting "enough but no more" the JCS would have to ask "how much is enough?"

How many B-52s are required to deter the Communists from embarking on a war of total conquest?

How many super-carriers and other surface ships are needed to perform the Navy's mission?

How many Army Pentomic divisions and missile commands are necessary to deter the Soviets and their satellites from periphery adventures?

How much air- and sea-lift must be provided immediately to move this force and its reinforcements if local war should break out?

Similar questions would have to be asked about air defense requirements.

BEYOND all this are the onrushing developments that will in a few short years bring the missile age to maturity and see the disappearance of out-moded weapons systems now costing billions of dollars.

Indeed the cost of these weapons is so tremendous that any reduction in their number even before the missile age comes to maturity will create substantial savings. For example, if careful reassessment of the global air fleet required to deter general war indicates that fifty fewer B-52 bombers are needed, there will be a saving of $400 million in aircraft alone, without crews and facilities. This is a substantial sum. Substantial savings might be obtained in other areas as a result of a complete reassessment.

It is acknowledged that manpower is an expensive commodity, but sudden, piecemeal and arbitrary strength reductions, such as the 100,000-man cut in the three services which was ordered in July, do not save immediately as much money as they appear to since such cuts are expensive in separation costs, the crash closing of facilities, and the manpower required to perform the necessary chores incident to these actions. Money can be saved by reducing force levels only if carefully planned and phased programs are followed.

The planning must take into consideration the muscle needed to meet the several priorities of deterrence.

An infantry or armored platoon stationed in the right place and manning the right weapons, and supported by the right kind of fire power is as effective a deterrent as a B-52 bomber or a warship. A few such platoons in Korea and there would not have been a three-year war costing billions of dollars and 25,000 American lives. These are what General Lauris Norstad has called "shield forces" and they compose, in his apt phraseology "the most sensitive line in the world."

TO insist that the instruments needed to give meaning and purpose to our national politico-military strategy should be based on requirements established by trained diplomats and soldiers and their political leaders and not by fiscal experts is not to exhibit a lack of concern for the fiscal solvency of the government and the economic virility of the nation. The economic health of the nation is an important element of the nation's strength. But economists do not agree in their analysis of the influence of defense spending on the national economy and there are competent ones who have said that this nation is well able to spend several billions more than the present annual rate of $38 billion.

But the all important facts are that any weakening of our politico-military posture at this time would constitute a victory for the international communist conspiracy and that this nation has the resources to support a soundly conceived military program that is based on requirements rather than a predetermined sum of money.

This is the answer to the witticism posed at the beginning of this editorial. Far more important than wealth in the race we are in is survival and the preservation of the freedom that makes it possible for us to enjoy such witticisms. In the life-and-death struggle against Communism our *fortunes* as well as our lives and our sacred honor must be pledged.

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THE ARMY'S MONTH

Army pomp and ceremony is to be reduced for the sake of economy. Behind the order was the fact that with 28 top defense officials and hundreds of minor officials entitled to traditional welcoming ceremonies involving parades, guard mounts, motorcades, bands and gun salutes, the military services have found the rendering of honors an all too frequent chore. The Army order said that "all visitors are encouraged to decline routine honors unless the ceremony serves a useful purpose."

Frequent school shifts do not handicap the children of service families. Dr. Lemos L. Fulmer of the Education Department of Louisiana State University reporting on a series of achievement tests given at a school near Barksdale AFB, La., said that the children of military families out-scored other students, with the children who had the most school changes scoring highest of all.

The new 40th Field Artillery Missile Group (Heavy), first designated to employ the Redstone surface-to-surface missile, was activated early in September at Redstone Arsenal, Huntsville, Alabama. It consists of the 217th FA Battalion, the 630th Ordnance Company and the 580th Engineer Company, a total of approximately 600 officers and men. The new unit, under the command of Col. Robert C. Gildart, is assigned to Third Army as part of the Strategic Army Force.

Project MASS, Modern Army Supply System, has been called an unqualified success at the mid-point of a two-year test by Seventh Army in Germany. One result: Seventh Army Stock Center inventory has been reduced from over 400,000 items to some 45,000.

The Army has been praised by Sen. Russell B. Long and Representatives Overton Brooks and T. Ashton Thompson of the Louisiana Congressional delegation for its fast and effective emergency action following Hurricane Audrey's devastation in that state. More than 1,000 persons were rescued by the Army in the hard-hit disaster area, principally by helicopter. In addition, Army Aviation's planes and helicopters spotted scores of bodies of hurricane victims and notified emergency collecting teams. About 500 Army officers and men were in the area lending assistance with relief equipment and supplies ranging from short wave radios to bulldozers, including 8,900 blankets, 5,850 cots, nine helicopters, sixty-four trucks, eleven ambulances, medical supplies, engineer construction items and mobile water points.

Maj. Gen. Paul A. Disney, commanding general of the U. S. Army Training Center at Fort Knox, Kentucky, has established a policy of no promotions and no assignments of responsibility for any officers or non-commissioned officers who are not working to attain the Army's minimum educational requirements: a high school diploma for enlisted men in the top three grades and at least two years of college for all officers. General Disney called the "low level of education of many individuals in our Army" a "definite threat to the Army's ability to carry out its assigned missions."

A standard public information plan has been set up by the Army for the announcement of major Army policy, plans and projects, such as acquisition of land for military training or experimental purposes, new aspects of national defense or changes in National Guard and Reserve policy. Requiring a detailed orientation of all federal, state and local officials who will have an interest in the policy, plan or project, in advance of public announcement and an orientation of the general public through news media, public speakers, fact sheets, correspondence and guided tours, etc., the plan proposes to forestall potential public relations problems and prevent public opposition.

First Army has appointed a committee to search out and eliminate all local regulations found to be unnecessary and particularly irritating to officers, men and dependents of the command.

Exercise All-American will take place at Ft. Bragg, North Carolina, during fifteen days in November. First of a series of field training exercises scheduled for Fiscal Year 1958, All-American will include the 82d Airborne Division, an Operations Company of the 313th U. S. Army Security Agency Battalion, a helicopter company and other units, totalling approximately 19,000 troops. The exercise will assume extensive tactical atomic weapons capability for both offensive and defensive units.

Representative Sikes (D-Fla), Chairman of the House Sub-committee on Army Appropriations, has introduced legislation (HR-8849) to provide additional college and high school science and engineering teachers by providing scholarships for members of the Armed Forces being released from active duty. Scholarships, under the plan, would be available to those being released from the service who possess the necessary basic training.

Tactical Lacrosse missiles are coming off Martin's production line at Orlando, Fla. These are improved versions of earlier models which were test-fired successfully at White Sands, and will be used for testing, training, and issue to operational units. Martin's new $7 million plant south of Orlando is scheduled for completion late this year. The Army will have the responsibility for scheduling all its mobilization defense production. It is the the first privately-owned and financed plant of its kind to be put under Army supervision.

This warhorse doubles as a pack mule!

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. . WHERE THE FUTURE IS MEASURED IN LIGHT-YEARS!

Brigadier General S. L. A. MARSHALL

Stress and Recovery

IN THE YEARS WHICH FOLLOWED World War II, our medical authorities hit upon 210* as the maximum of combat days for the average American soldier.

That did not say that if he served 211, he was pushing his luck and, according to the actuarial tables, had become a 5-to-1 shot to win a bullet on his next patrol.

There could hardly be a quarrel with any such Univac-like computation of frontline danger, if it were available. It is a sweetly solemn fact, hardly subject to dispute, that the longer a body stays within range of flying steel or flung tomatoes, the less grows its chance of escaping unhit.

What could be inferred from the figure was that after 210 days duty in line, an average fighter gets slack, dull and perhaps excessively morbid. Of that condition in its typical individual would come an abnormal rate of human wastage within the field army.

The figure must be purely conjectural since it takes no account of how the days are distributed or of whether the soldier lasts longer because of remissions from battle pressure.

There being no such thing as an "average" American experience under continuous or repeated battle stress, there is no way of determining a general tolerance limit.

To emphasize the point: It makes a world of difference whether a soldier serves 210 consecutive days in a Bataan-like situation, or favored by fortune, serves that many days under fire at intervals spread over a lifetime. In the latter case, he may escape mental and moral erosion altogether.

However, there is a larger reason for looking askance at the figure. This was a point which could never be proved by statistics unless there was a corresponding showing that our system of conserving our human material in combat was already beyond fault.

While that is lacking, any item in proof that the average American fighter has decidedly limited resources is by its nature reproof of a system which has not learned to exploit them providently.

THEREIN LIES THE REAL PROBlem. In our wars since 1917, there has been too little flexibility in the administration of the battle force to permit conservation. The line commander, seeing a good subordinate near the cracking point (and this is fairly easy to determine) lacked authority to rotate him briefly to rear area duty for recuperation. Too often, the man had to break before anything was done. Because our infantry reserve was always less than the actual operating needs, there was seldom a chance to apply common sense methods even in affording the combat unit itself respite from pressure.

But had we ever been in position to use sound conservation, not only would we have saved much wreckage, but we probably would have learned that the American soldier, rightly used, will stay good for an indefinite number of combat days. In fact, his nerve for combat will not diminish markedly through repeated experiences over the years.

Fear and its degenerative effects are not cumulative, except as careless handling permits it. It is a weakness in us that we continue to discount the amazing regenerative capability of the human mechanism. This is less because specialists in that mechanism are shortsighted or unimaginative than because men who make personnel policies with sliderules are not prepared to listen. We may be approaching the point where we will either do better or go down.

However, my immediate purpose is to deal with a narrow sector of this subject. Ten years have passed since the *Infantry Journal* devoted one whole issue to what has since become labeled "The Fatigue Theory." It was a radical notion at the time, the core of it being that fear and fatigue are concomitant and reciprocal in their physical effects on man on the combat field. The more heavily men are loaded, the farther they move, the greater becomes their fear. The more intense their fear, the greater the impairment of physical strength. Whether the degradation comes of work or of terror, recovery is a function of time and of the extraordinary regenerative potential of the body mechanism.

What was then a mere speculation based upon battlefield data has in the years since become a quite generally accepted and laboratory-proven truth, though scientific argument about the particulars continues. The Army moved with astonishing celerity once the idea was loosed. One of its field boards picked up the subject. There was brought about a wholly new concept of one-man logistics which has resulted in a broad program modifying all man-carried equipment and procedures. Some of my scientist colleagues in Korea ran combat tests to determine the chang-

*"Battle Casualties." Findings of an AGF Board as reported in *Infantry Journal*, September, 1949.—The Editors.

ing chemistry of man under fire. Perhaps science must proceed in this way. To me it seemed like running for a street car after you have caught it.

By then, it seemed high time to look in another direction. We needed to know more about the recuperative factor, or interval, and Korea was the best of laboratories for researching that question because most of the fighting there maximized physical stress and moral pressure.

It is not enough to know that a fighter can be knocked down and out by fear and fatigue. One need ask how soon and by what means can he be brought up from the canvas, swinging. Had this line of inquiry been sedulously followed up in Korea, I feel confident that by now we would have a set of radically surprising answers, some of which would alter training methods, command doctrine and tactical procedures.

BECAUSE MY TIME IN KOREA was perforce devoted to other lines of combat study, the data justify the reporting of only a few general conclusions. The first and most important one is that relatively little sleep is needed to re-invigorate and make combat worthy a fighting company which, judged by every appearance, has reached the point of total exhaustion. The transformation may take place in as brief an interval as refreshes a fatigued motorist when he pulls to the side of the highway for a catnap.

When first dealing with troops in Korea, I heard numerous rumors about men who had become caught and killed in their sleeping bags. The bag was described as a "death trap." In all of my searching I did not find one provable case.

But there were numerous episodes wherein such an entrapment might have occurred. The company had arrived late and exhausted at its ridgeline objective. The young commander knew he was supposed to remain at full alert because of the near presence of the enemy. However, looking his men over he saw that they were in no shape to fight. So he took a chance and told them to get into the sacks, leaving only a few sentries to outguard the position. Twenty or thirty minutes later they were hit straight on, with the enemy inside the outguard line before the alarm was sounded. The men were out of the sacks, and up and fighting with greater speed and fury than the commander had ever thought possible. The ground was held.

In other companies, alongside these same units, or fighting under the same conditions, the commander had followed an opposite course, playing it safe, he thought, by keeping all hands "alert." When hit, the command had no unity of action and rapidly dissolved. The average reaction was trancelike. Driven from the ridge crest, the men could not reorganize to counterattack.

Nature cries out against arbitrary orders in circumstances like these. Squad leaders do lip service to what is directed, then on returning to their positions, modify it, put one man on guard for a spell and tell the others to keep one eye open. But it is an unsatisfying compromise.

After an all-night defense in which hard body blows and fear had reduced it to a state of paralysis, one company of the 27th Infantry Regiment was told by its captain to sleep. The men had been in the sacks for less than one hour when came the word that this same company would prepare an attack against the key enemy ridge blocking the withdrawal of the 25th Division. It hit at 1100. As the assault started, all officers were shot down. The uphill attack which followed, carried right to the skyline under noncommissioned leadership against heavy fire, was one of the most thorough and courageous charges in our history.

IN MY STUDY OF OPERATIONS I found also what appeared to be a direct co-relation between the duration of the period in which the individuals had been under excessive emotional pressure and the time required for complete rest, after which thy would bound back to normal.

That is to say that while the company, beaten down by four hours of intense pressure, might react as listlessly and seem as completely exhausted as the unit which had been isolated and under extreme rigor for four days, and seemingly had the same critical need of immediate rest, it would recover tenfold as quickly.

The 7th Marine Regiment had a weird, eye-opening experience when, on the march to the Yalu, its patrols first encountered intense cold and a fighting enemy simultaneously. After only a few hours of it, these men, under medical examination, reacted as if in an advanced state of shock. They could not speak. Some stared into space. Others cried like babies. The pulse rate was exceptionally low. The puzzled doctors gave them brandy and put them to bed for eight hours. On awakening, they were all normal.

Now compare that with the experience of the troops trapped on the eastern side of the Chosin Reservoir. This was the harshest ordeal suffered by any Americans in Korea apart from the men made prisoner. In five days these troops of the Army's 7th Infantry Division experienced defeat, loss of their commander, temporary capture, starvation and exposure in 30-degree-below-zero cold.

Some 350 of them were rescued at last because their Red Chinese captors were too paralyzed by cold and hunger to hold them so when they came out across the Chosin ice, many could not walk upright. Several used their frozen legs as skis in hand-paddling toward the rescue party. Anyone watching this party must have despaired that it would have further military use.

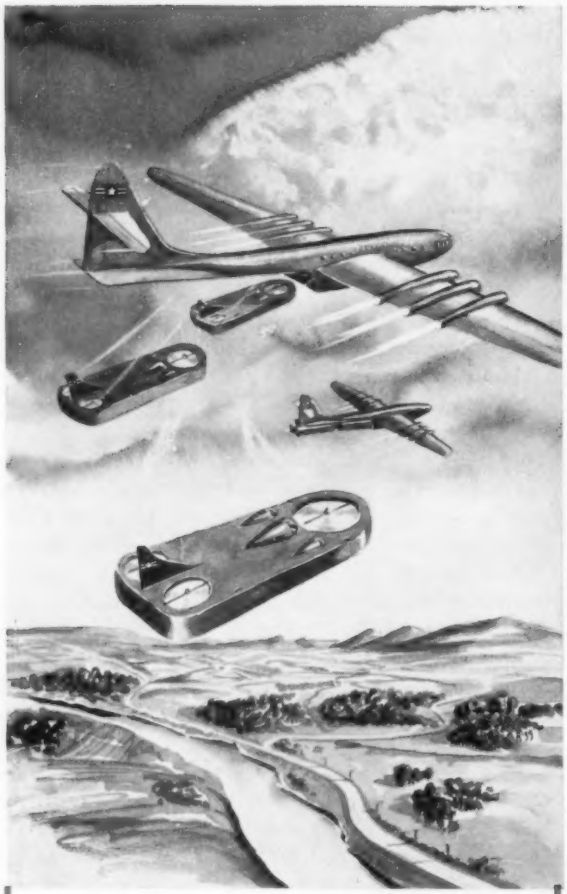
But except for the acute medical cases, its members within three days took their place in line and later marched out with the Marine Corps column. Major General Oliver P. Smith had ordered that these soldiers be given forty-eight hours continuous rest in the sacks. The point is that they did rebound to normal.

All of the thoughts here expressed are pertinent to one central theme. Whether we are thinking about doing at sunset that which will restore man for the engagement of the night or of so administering him over war's long term that he can be returned as a more useful citizen of the Republic, the rule of action is that he be afforded temporary relief *in time*.

AIRBORNE

LIEUTENANT COLONEL ROBERT B. RIGG

ILLUSTRATED BY THE AUTHOR



Substitute for the Parachute? This concept envisions the delivery of airborne troops and equipment by means of giant aerial jeeps. These ducted-fan-powered vehicles not only provide a means to sweep in on target at treetop level and infiltrate more successfully in areas with strong air defenses, but they also give the airborne troops organic transportation within the mobile airhead. The box-like jeeps form a part of the aircraft fuselage and are jettisoned at some distance from the target area, allowing the attacking troops to come in at low altitude and thus making enemy radar detection very difficult.

Almost two hundred of the Army's leading Airborne officers met at Fort Bragg in May for the 1957 Airborne Conference—the first since 1955—designed to "fusion vision" on the future of airborne warfare. The Conference discussed problems ranging from the employment of atomic weapons within a corps airhead to electronic reconnaissance during airborne operations. While the Conference focused on the near future, there was a realistic, feet-on-the-ground approach to current problems and issues, not the least of which was a visible, collective dissatisfaction over the lack of sufficient strategic airlift. As one officer remarked, "We're air-minded but not air-conditioned."

WARRIORS Look to the Future

IF there is ever war at some distant date, some American troops may ride in high-soaring ballistic missiles to a battlefield deep inside enemy territory. While our airborne arm has not publicly laid claim to this role (the possibility of a troop-carrying missile was first publicly mentioned by Lieutenant General James M. Gavin in October 1956), airborne thinkers believe that they will use any and all future means to get in deep. While the date is still quite distant, the airborne soldier of the future may well become "the warhead warrior."

The pattern of airborne forces of the future was thoroughly discussed recently at a Conference at Fort Bragg attended by experienced airborne officers. The Conference concentrated on the near future and kept its feet firmly planted on the ground in its approach. It was a privilege for me, a non-airborne soldier, to receive an invitation to attend this conference from Major General Paul Adams, XVIII Corps commander, who suggested that I might want to write about what the airborne people are thinking and doing.

Gun-packed persuasion

Today's airborne force of three divisions differs so greatly from that of World War II that the contrast may be likened to the difference between a Model T Ford and a power-packed Jaguar. Where in 1945 we had only two types of troop-carrier transports, we now have five. The old C-47 carried less than twenty troopers; today's C-130 carries 64. The C-47 could land about twenty-four troopers; the modern C-124 can put down 222. The World War II trooper dropped into combat carrying his mortars, small arms, and 75mm pack artillery. Today, he goes into action

Action Upon Landing. A giant aerial jeep disgorges airborne troops, vehicles, target surveillance drones, and missiles. Soldiers take to aerocycles for local reconnaissance while target surveillance drone missiles are launched for more distant reconnaissance. Meanwhile short-range missiles are set in place for initial strikes as the television drones cover distant areas.

Lieutenant Colonel Robert B. Rigg, *Armor,* is a steady contributor of meaty articles to *ARMY.* Readers will recall his "Soldier of the Futurarmy," which appeared in the November 1956 issue. The article was reprinted by several American magazines including *Science Digest, Bachelor,* and *Catholic Digest* (in two languages), and by foreign military journals. Colonel Rigg has published two books, *Red China's Fighting Hordes* and *Realistic Combat Training.* Recently selected by the Augmentation Board for a commission in the Regular Army, Colonel Rigg is presently on duty in the Pentagon.

with air-dropped 15,000-pound SPAT guns alongside him. In addition, the Honest John atomic rocket can be landed in an airhead. In a tomorrow not far off, Little John will drop into combat with the paratrooper just as the 155mm howitzer is parachuted today. Summed up, the present-day airborne division has atomic fire power and modern artillery instead of the 75mm gun of 1945. The Pentomic division's fire power is packed with gun persuasion in several forms.

Today's aircraft have increased the mobility and range of action of airborne forces. Two modern transports (C-97 and C-124) have maximum ranges of 4,000 miles contrasted to the wartime C-46 and C-47 which ranged only 1,440 miles. As for tactical mobility, the C-130, with a range of 2,000 miles, can drop 64 parachutists. The C-130 can get twenty tons of military equipment airborne in twelve seconds in contrast to the three tons lifted by the transport of 1945. Because today's aircraft carry much larger tonnages, the number required per combat unit has decreased over the past fourteen years. In consequence, air-space requirements have also been reduced. All in all, the art of airborne warfare has greatly progressed since 1945.

More than any other types, airborne forces are most directly and effectively useful in cold war, limited conflict, and general war. In cold war they represent the Nation's "hole card"—mobile forces always ready for rapid deployment—and so are a deterrent force. In limited war they would likely be the first Army forces strategically deployed. In general war they could carry out a variety of missions, such as reinforcing combat elements already deployed, filling strategic gaps where there were no deployments, and interdicting enemy forces by vertical envelopment.

It is likely, within the future proportion of things to come in certain types of war, that airborne forces will seize enemy missile bases and nuclear stockpile sites. It is possible that entire airborne campaigns will be launched just to search out, locate, and seize hidden bases and sources of long-range missiles. Certainly, one of the best-kept secrets of an aggressor would be the location of his great missile bases. While some may be discovered from the air and neutralized by bombers or missiles, others will not be so easily found and neutralized. Thus, in any type of warfare, airborne forces have a significant mission.

Romance between the Big A's

Today, there is a very obvious romance between the Army's big A's: Aviation and Airborne. The 77th Special Forces and the 82d and 101st Airborne Divisions are making active and imaginative use of Army aviation, and current airborne thinking is that Army aircraft also will play a very significant role in future airborne operations. This does not imply any intent to usurp the established Air Force role and functions in airborne warfare, but rather the use of Army aviation for combat reconnaissance, tactical movement, and local supply once the airborne forces are fighting on the ground. The big quest, of course, is to give a higher degree of tactical mobility to air-dropped and air-landed forces. Army aircraft offer excellent promise here, and extensive use of helicopters, fixed-wing craft, and flying platforms is visualized. At the Airborne Conference's combat demonstration some twenty-five aircraft fulfilled forty-eight missions in one hour. During the tactical play of the problem a variety of aircraft carried in troops, supplies and weapons by contour flying, conducted reconnaissance and aerial photo missions, laid wire, and evacuated casualties. An impressive demonstration by sky-cavalry craft climaxed this tactical exercise. H-13, H-21 and H-23 helicopters armed with caliber .30 and .50 machine guns and 8cm rockets, bounced out of defilade positions to take targets under fire. Later they swept another set of targets with fire and then charged across them. At this point, there was no need for such versatile aircraft to further excite the imagination of the audience. Visions of a line formation of hundreds of helicopters came to mind—rising from behind hills to bounce up and down, firing in defense or counter-attack, or attacking enemy flanks and outposts and lowering troops for three-dimensional tactical envelopment. While the concept of armed helicopters is not yet official

Exploitation of a Medium Range Missile Strike. Helicopters and tilt-wing aircraft pick up and move airborne troops after they have found and fixed a major target complex. Army pilot substitutes for an airborne soldier to direct rocket-launching drone helicopters (top) for close-in protection as the troops leave this particular battleground to launch a new attack.

and the conduct of fire technique is still in its infancy, the possibilities are such that an entirely new dimension of fire power is likely to be added to combat. In fact, these craft offer a point of departure for what the airborne forces presently need most—flying tanks that can surmount barriers without bridging equipment. These armed craft might be said to be the prototype of a transitional combat vehicle —a radical new type of aerial tank or gun platform. The possibility of arming helicopters with the DART antitank missile was raised informally. Furthermore, knowing that the Army has successfully flown drone helicopters, it takes little imagination to visualize that armed drone-choppers may become the sky cavalry's Headless Horsemen of future battle.

Individual flying platforms appeal to today's paratroopers who don't mind marching, but who want light and new rapid transport that can also surmount barriers quickly and give them greater mobility.

But regardless of these prospects, one significant fact emerges: Army aircraft will provide new tactical mobility for paratroopers and airlanded troops in the future airhead which, unlike the aerial beachheads of the past, will be three-dimensional.

Shape of things to come

The potent combination of the corps airhead and the missile warhead looms large in the future. Medium-range missiles will be to future paratroopers what artillery was to the doughboy.

Among the many concepts emerging from the Conference was the one that an airborne corps can seize an objective and build up sufficient strength to stay in enemy territory. This does not mean, however, that the airhead would stay in one place. A new corps airhead envisioned is of the *amoeba* type—a fluid force in constant, dual motion, the airhead itself shifting or moving overland by new means and machines of mobility, while within its mobile framework, units will vacillate. Two purposes lie behind this concept of dual movement. First, movement will be necessary in order to reduce the airhead's vulnerability to atomic weapons. Second, by dual movement the airborne units will serve to keep enemy forces on the defensive. Airborne thinkers also visualize that this future airhead will have a definite need for medium-range (200 to 1,500 miles) missile support. While troops in the airhead will have their own missiles (presently Honest John) they want to have on call the all-weather reinforcing fires of distant and more powerful missiles.

Turning to a corps type vertical assault of the future, we can visualize medium-range missiles preceding airborne forces as they are launched deep into enemy territory. Missiles will strike at hostile missile bases, airfields, tactical formations, and any other forces or means capable of interfering with establishment of the airhead. The initial airhead may in fact be a series of smaller airheads which, after landing, join up in combat structure as mutually supporting in a tactical sense. Then using their own organic tactical missiles (now Honest John) the airhead forces will attack and move. Next, by coordinated effort, medium-range missiles, up to 1,500 miles back, will strike those targets which the airhead's own missiles and forces cannot quickly reach —targets which will interfere with the mission of the airborne force.

The corps assault force of the future will not be groundbound to foot-paced speeds that characterized its past. Instead, airborne troops will move by helicopter, flying platform, and aerial jeep. Air mobility will be theirs even after they have landed. Thus, paratroopers will wage three-dimensional blitzkrieg.

Mobility provides staying power

How long can these troops remain deep inside enemy areas? When will they have to be relieved? Today, in asking such questions you date your knowledge of airborne operations. While it is not conceded that airborne troops will fight forever inside a hostile area, the airborne art has reached the point where the relieve-'em-in-three-days concept is obsolete. For one thing, their new organic mobility will give these forces much better staying power because they will be able to shift about rapidly. With the development of flying platforms, collapsible one-man helicopters, aerial jeeps, and new forms of VTOL and STOL craft, these forces will be truly locally and tactically airborne. A future airhead can become a series of shifting islands of force thrusting and moving in tactical concert to box in, encircle, and destroy opposing forces; to move on rapidly to new areas; or to disperse. The greater the ability to change tactical dispositions rapidly the longer an airborne force can remain successfully in hostile areas.

The second factor contributing to longer staying power will be fire power. Consider this first in terms of logical fire power, which is atomic. The present-day potency and range of this *organic* divisional fire power is several times more than that of the airborne division in World War II or Korea. Looking a bit farther into the future, there will be the *supporting* fire power of the medium-range missiles which can stitch the region around an airhead to destroy enemy reinforcements that may seek to liquidate the airborne forces.

Certainly, enemy medium-range missiles constitute a threat. But the airhead will be alternately moving, attacking, and dispersing, and its dexterity will be essential to success. Possessing their own helicopters and other aircraft, airborne forces in the future will not be blocked by enemy and terrain barriers. Furthermore, with their new degree of mobility they will be better able to sweep over enemy regions, attacking successive targets in blitz fashion, and in the process will offer fleeting targets, difficult to strike by missiles. An airborne corps, landed several hundred miles beyond an already established battleground, can fight its way right down the enemy lines of communication and thrust its combat power onto the backs of an enemy already fighting in another direction. This nutcracker strategy would see both American elements moving toward each other, thus placing the enemy between two jaws of military power, each jaw adjusting to compress the aggressor forces into tighter, more concentrated targets for missile strikes.

Airborne invasion will force the enemy to concentrate certain of his forces before attacking the airhead. In so doing, these forces will be vulnerable to atomic attack. This will be especially true where airborne units seize a region vital to the enemy.

Lending new proportion to airborne operations are the rugged assault air transports which can belly in on unimproved fields to disgorge other troops, discharge weapons and supplies, and load wounded for quick evacuation. Slamming down at rapid successive rates and with fast loading, transports can also rapidly shift or evacuate combat

forces. Again, we did not have these versatile craft in World War II, and they have greatly altered the proportion of things to come. This is especially true in building up the combat strength of a future airhead. These craft will bring in the helicopters, flying platforms, and other tactical aircraft necessary for airborne operations as they are now conceived.

Challenges before the vertical corps

Many challenges and problems confront future airborne operations in any conflict where atomic weapons are used. First of all, there is the matter of marshalling under nuclear threat. Although the problem is complex, doctrine and procedures have been worked out that will permit launching airborne forces into action relatively secure and dispersed. The key to future successful marshalling is a combination of dispersion, coordinated timing of troop movements, rapid communications, and precise command control over dispersed units which must be phased into the staging processes with much more precision and decision than in the past. Here again, helicopters and other Army aircraft will be vital because they can rapidly feed in troops for loading from dispersed assembly points.

Another challenge to the vertical corps is the matter of getting inside enemy areas in an age when aircraft are the targets of guided missiles. (One of the discussion groups tackled the problem of determining "the feasibility of airborne operations in the face of an enemy area-type air defense capability." This group also sought to determine the future role of night airborne operations in light of recent weapons and equipment developments. The panel's findings and recommendations are classified.) Enemy cities and certain air defense regions in a homeland will be defended by area-type missile defenses, but airborne troops would not normally be flown in over areas of high-density defenses. Furthermore, the aggressor armies would be largely operating outside their own territory and fixed surface-to-air missile bases would not be as formidable.

Certainly the air transports will need a sheath of protective aircraft—that is, combat air superiority—to cope with enemy aircraft and air-to-air missiles. No strategic target can be regarded as inaccessible from the air. It may not be profitable to parachute or land atop a particular target, but it is possible to land near and sweep in on it, using organic means of transport like helicopters and related aircraft.

Once on the ground and in action target acquisition and surveillance are of vital concern to the airborne, as well as to the Army as a whole. During its initial discussion of this topic by one panel there was considerable argument as to the extent and range of responsibilities of the corps in its reconnaissance effort out of the airhead. One group took the yardstick, or "mile-ruler," approach and held that 15- to 50-mile limits should be established. Their opponents fought for the anything-that-can-interfere-with-the-mission concept. Both sides ran head-on into the fact that medium-range missiles eventually can menace airborne operations in both the marshalling and the airhead phases. Target acquisition and surveillance posed problems well beyond the creation of exotic-electronic hardware. For example, to ensure coordinated effort and success, reconnaissance functions and responsibilities must be precisely defined and aligned between the services and forces involved.

Local superiority in atomic weapons and other fire power can be meaningless if, for example, a corps airhead lacks the means to find and fix enemy targets. (While the report by a panel of G2, ASA, CONARC and other representatives who met on the subject was classified, it did back an accelerated R&D effort in the direction of the new devices.)

Logic in logistics

Airborne forces reinforced by air-transported divisions and corps troops build up to an airhead requiring an efficient logistical support system that can keep supply tonnages going in steadily. What form will aerial logistical support take? The mind can easily foresee that at quite a distant date giant cargo missiles will bring supplies into the airhead. However, even these expensive cargo carriers will not eliminate the necessity for aircraft-landed supplies and men and, of course, air evacuation of wounded.

Turning to a less distant future, aerial logistical support will be a combination of air-dropping and air-landing.

In their quest for better airhead mobility the Airborne has the bear by the tail; for with every additional helicopter, flying platform, jeep, and truck placed in the airhead there is a mounting requirement for fuel. Furthermore, the contemplated use of these vehicles is extensive. As airhead elements shift in order to reduce vulnerability to atomic weapons, increased demands will be placed on reconnaissance and transportation elements with a resulting rise in fuel consumption.

Airhead fuel supply constitutes a major logistical problem. However, there is practical promise in mass drops of 500-gallon flexible containers using high-velocity chutes. We now have these and other similar containers.

As for food and ammunition, newly developed cushioning materials like paper honeycomb give greater drop accuracy and reduce aerial delivery costs.

Airborne planners are still seeking better ways to deliver cargo into a combat area rapidly. There is a need to improve on present-day "doorway delivery." Perhaps detachable, pod-like cargo crates for bottom-drop-out from aircraft fuselage may be developed. Next is the problem of slowing up such cargo crates. Perhaps the parachute will eventually give way to a rotochute—a motor-driven propeller designed to stabilize and slow up the descent. Jet-tipped rotochutes are a possibility and could be a probability depending on the success of our research in chemical fuels.

The conferees looked hard at aerial logistics, remaining optimistic about the future but conceding that considerable work lies ahead to improve the aerial supply and evacuation system.

The "lean and mean" attitude was most manifest in respect to matériel weights. (This panel's report was classified.) The old cry, "lighter weapons and equipment" was sounded with new urgency. After years of lashing equipment for heavy drops the airborne is showing mounting dissatisfaction with the process of piecemeal paring of matériel weights. What they hope for is a quantum jump that will lead to airborne equipment that might be symbolized by a titanium truck. While wanting precision weapons, it is plain these leaders are not seeking jewelled equipment.

As Major General W. C. Westmoreland said in his opening address: "We must design and develop our matériel so that it is adapted for rapid and easy movement—strategically and tactically. . . . We must exploit strategic mobility by emphasizing light and compact equipment that will be easily air transportable."

One significant logistical recommendation was for addi-

Future Airhead Logistics. Supply by rotochute canisters, a future substitute for parachute delivery. Jettisoned from aircraft at much higher altitudes than pictured here, the canisters would have folding propellers which would open after drop. Powered by jet pods or high-speed motors, the propellers of each supply canister would spin in reverse to slow down the descent of the canister whose end would be cushioned for impact.

tional medical and hospital support in the future corps airhead. It has been a traditional feature of our military operations to provide relatively generous medical facilities for the care of wounded. The airborne soldier is entitled to the same degree of medical support given his brothers in arms.

Nobility of air mobility

If any topic keynoted the Conference it was strategic mobility—placed on a high pedestal because of its vital importance to national security. As General Adams said: "Achieving mobility is the Army's greatest problem."

It was pointed out that if the Army had more strategic mobility it could accomplish its world-wide missions more effectively by enhancing the present limited mobility of the Strategic Army Forces.

As the most mobile portion of the Strategic Army Forces, the airborne group recognizes the urgent need for ample strategic air mobility because the deterrence of war or the smothering of aggression rests heavily on the speed of our response. It was plainly concluded that air speed is essential and that the Army's strategic mobility must be improved by the availability of more aircraft. However, the Eighteenth Air Force was commended for its support of Army Airborne readiness and for its proven ability "to work jointly and live roughly" and to operate in underdeveloped areas as it has in support of the DEW line, in the Antarctic, and in support of XVIII Airborne Corps.

General Adams and other airborne leaders believe that the Military Air Transport Service (MATS) presently can support rugged and realistic airborne operations only to a limited degree, because it operates from fixed bases and lacks mobile maintenance and communications. Consequently, they recommend the establishment of a "Combat Airlift Division," with the necessary mobile maintenance and communication systems, conditioned for operating in underdeveloped areas.

Mobility and the amoeba airhead

General Adams urged airborne leaders to study all mobile operations in order to translate their principles into future use. "We talk less and less of real military history. Instead we fall back on our personal military history." The study of history should not be limited to airborne operations. "Consider the classical role of cavalry. . . . In this connection, the campaigns of Lee and Jackson in Northern Virginia and Grant and Sherman in the West and South . . . provide much food for thought. The operations of Sherman from Atlanta to Savannah and thence to Virginia offer many lessons on the fluid movement of an army without tail, the amoeba as it were. . . ."

Airborne officers are thinking in three-dimensional terms. They visualize the future airhead as an amoeba-like structure of units perpetually moving and changing shape. They look to the helicopter and other three-dimensional vehicles to give the amoeba concept its real fluidity and motion. They regard the parachute and the helicopter as complementary and visualize, as General Adams expressed it, that:

"The parachutist is going to become quite ambidextrous. He will jump out of aircraft for some time to come, but he will also fly to battle in helicopters and convertiplanes, and cross rivers on flying platforms or aerocycles.

"In addition, evidence from Exercises Sagebrush and King Cole indicates that crossings of major rivers cannot be successfully conducted against an atomic defense without a large measure of surprise being obtained, or by creating by airborne means a threat so great in the enemy rear that the enemy must forsake the river line."

While the Conference concentrated on airborne operations, it was evident that airborne planners are not thinking solely in terms of their own arm. Analyzing their statements, one sees the eventuality of a single type of mobile division. Furthermore, the Airborne is looking around. One high-ranking officer emphasized that the mobility "used by elements of the Army other than airborne enhance our combat power greatly, and must be integrated and exploited in our thinking and concepts."

It is no secret that the Airborne wants its divisions to be officially termed "parachute divisions" instead of "airborne." They want more aircraft available for training. On this they are adamant because they regard their arm as a potent force for preventing wars or quickly squelching them.

We Must Decentralize

The speed and flexibility of our battle groups will be lost to us if we don't decentralize now. Here are some suggested ways to do it

MAJOR LUCIUS F. WRIGHT, JR.

THE Army is converting to the Pentomic organization in an effort to achieve speed and flexibility of control to meet the threat of atomic war. The key to success in atomic war is decentralization and mission-type orders. What, then, is our state of progress toward decentralization and flexibility of control?

The fact is that in spite of high-sounding theories, control in the Army has never been more highly centralized than it is today. A whole generation of officers has never known freedom of command and initiative, and hence does not miss it. The commander's time-honored complaint of invasion of his prerogatives by higher headquarters is fading away in the present situation.

Let's take a look at a few more or less typical examples of centralization of control by higher headquarters to prove the point.

The first example concerns operations plans and orders. The Command and General Staff College teaches that division operations plans and orders should be no more specific than absolutely necessary, to assure coordination and unity of effort. That is the teaching, but what is the practice? Most of us in recent years have seen division orders and plans wherein the mission of each major subordinate element was not only spelled out, but execution was dictated in detail. Even in cases where written orders are brief, the G3 usually orally spells out details of implementation with the same over-all purpose.

A second example is the widespread current practice of reserving for division commanders Article 15 jurisdiction over officers. In defense of this invasion of command prerogative, the statement is made that Article 15 punishment is so important to the career of an officer that a staff judge advocate should evaluate each case. A similar case could easily be made for the importance to the career of a noncommissioned officer.

A third example—this one in a TD type of unit—is the current review of MOS assignments for enlisted men in certain overstrength career fields. Specifically, a supply sergeant, whose present assignment is in his career field, was reassigned as a helicopter mechanic as a result of board action by a higher headquarters. The sergeant's career field is overstrength, the new field understrength. The board's action was final. Appeals by the sergeant's commander to the higher headquarters were to no avail. The decision was made by a board whose president was a lieutenant; the appealing commander was a lieutenant colonel.

Again from a TD organization, the

Major Lucius F. Wright, Jr., *Artillery,* a 1943 graduate of West Point, the Artillery Basic and Advanced Courses and Leavenworth, returned from Korea in 1956 where he was assistant G3 of the 24th Infantry Division and commanded the 52d FA Battalion. He is now Assistant PMST at Xavier University, Cincinnati, Ohio.

fourth example. This one concerns a college-level ROTC unit. The PMST is not permitted to dismiss an Advanced Course student who displays lack of aptitude or the requisite officer qualifications without first sending the case for review and approval to his army headquarters.

Evils of centralization

What are the evils demonstrated by these four examples? It is true that the higher the headquarters the more senior the commander. But who in fact rules on the majority of such actions as those cited? Usually a staff officer junior to the responsible commander. The G3 at division makes up the plans and orders, often in much more detail than required by the situation. The staff judge advocate, in the vacuum of a distant office, rules on the Article 15 cases based on lengthy and detailed written reports. A lieutenant MOS board president rules on the sergeant's case; and finally, a major or lieutenant colonel at army headquarters rules on the disposition of the ROTC cadet. This is understandable when you consider the demands on the time of a senior commander, but how then can reserving command decisions of subordinate commanders for his staff officers be justified?

Loss of prestige and authority

Another evil of centralization is the loss of prestige and authority for the subordinate commander. A regimental commander is presumed incapable of thinking of all the details the G3 thinks of in detailed and restrictive operations plans and orders. In the case of Article 15 jurisdiction, the impression is given that division artillery, regimental, and separate battalion commanders are judged incompetent to mete out justice to their officers. The TD unit commander is not qualified to recommend who should be awarded a new MOS. The PMST is presumably incapable of determining the qualifications of ROTC cadets for commissions.

In all but the first example the decision was made by a staff officer for the responsible subordinate commander. The decision was based on reports and records furnished the higher headquarters for the purpose. Voluminous reports were required solely to permit a staff officer, junior to the responsible commander, to make a decision. And this decision was very likely made in the name of a commander who probably was personally unfamiliar with the case.

What can be done about this lack of confidence in subordinate commanders, this inflation of the importance and power of the staff officer, this tremendous flow of paperwork? The obvious answer is to stop it. It really isn't that simple, however. Staff officers themselves in many cases don't realize what is happening and certainly higher commanders don't realize it. Much of it is disguised as help for or assistance to the subordinate commander. What then can be done?

One solution to the problem of decentralization is a conscious effort on the part of all commanders and staff officers to prepare plans and orders in no more detail than necessary to assure a coordinated effort. They must also study assistance to and reports required of subordinate units carefully, to avoid infringing upon the lower commanders' prerogatives.

Side benefits

Although such a program may result in some confusion until subordinate commanders learn to handle their responsibilities again, there will be an attendant reduction in the size of staffs now necessitated by the volume of paperwork. There should also be a decided decrease in the volume of detailed reading and study required of staffs and lower commanders, with a consequent increase in time for thinking, planning, and for staff visits. Above all, we will increase efficiency in the long run and develop commanders with a high degree of initiative and resourcefulness.

Why is this problem of centralization of control by higher headquarters so pressing right now? The answer is twofold. First, there is the increasing need for economy of operations. Secondly, there is the urgent problem of producing both a system of command and commanders who can meet the challenge of the atomic battlefield with speed, flexibility of mind, initiative, resourcefulness, and the ability to act in the absence of specific orders. Combat usually acts to reduce the volume of administration to that absolutely necessary and to put responsibility for command where it belongs. The question is: Can we afford to wait for combat to force the decisions?

THE FIGHTING INFANT

RY DIVISION TRAINS

They can fight if the trains commander works out a tactical SOP that recognizes the non-tactical nature of his units

COLONEL JOHN F. RHOADES

THE new infantry division organization incorporates the division trains concept, formerly normal to the armored division. Both the organizational concept itself and the impact of atomic warfare on the infantry division's administrative and service support agencies, normally a part of the division trains, pose new problems for the average trains commander. I propose to discuss some of his problems and offer possible approaches to their solution.

Training Text 7-100-2 (The Infantry Division), published this year, states that the trains commander is responsible for all *tactical* activities of the division's trains. This text also clearly limits his role by stating that he is not responsible for the operations of the administrative and technical service units assigned to his command. Broadly, he is responsible for the movements necessary for his units to perform their primary function, for organization of the trains area, and for security of his units both on the move and in bivouac or when they operate in the trains area. During peacetime the trains commander is charged with tactical training in marksmanship, marches, bivouacs, security and defensive combat.

The problem of security

While training, a leader must visualize the probable nature of combat and his unit's role in it. Obviously, the tactics and procedures developed in World War II must be modified to meet the conditions of the atomic battlefield. Insofar as their tactical impact on division trains is concerned, most are problems of defense and security. The requirement for dispersion will create a more amorphous combat zone, thus increasing the probability of sizable enemy guerrilla operations and of enemy mobile task forces operating in and behind the division's rear areas. Therefore, trains must be prepared to defend themselves against local ground attacks by sizable forces. Further, the need for dispersion controls the allotment of space in the division's rear areas. The ordnance battalion, for example, must not set up shop within vulnerable distance of a general support artillery battalion, thus creating a remunerative concentration of men and equipment. G3 has general staff responsibility for rear-area defense, G4 for damage-control plans. We need an executive agent to implement those plans and to safely distribute units, agencies, and activities in the division's rear area. This job logically falls to the trains commander, who is charged with implementing damage-control plans and rear-area defensive operations for the division's service area. Operating under the guidance of G3 and G4, the trains commander ensures that tactical units have access to the areas they require to accomplish their combat missions; that supporting units can reach areas necessary for accomplishing their administrative and service missions; that all agencies are so located as to avoid creating vulnerable concentrations; and that optimum use is made of terrain, and rear-area units are placed for greatest security against attack by guerrilla or other ground forces.

Colonel John F. Rhoades, *Armor*, a 1935 graduate of the Military Academy, was with tank destroyer units and commanded a cavalry reconnaissance squadron in ETO during World War II. He has been an instructor at West Point and is a graduate of the Army War College and of the Command and General Staff College, where he has been on the faculty since 1955.

The problem of training

The problem of allotting space, though new in degree and most demanding, is not novel or unique, and can be met by advance detailed planning, coordination, and map and ground reconnaissance. The use of helicopters in ground reconnaissance should be most profitable, and plans for employing them should recognize such use. The problem of training the units of division trains in security and defensive combat is challenging. Organization works against, rather than for, the trains commander, since it is designed to support the primary duties of his command, which are *not* tactical. Further, the operational pattern of the units of division trains in garrison militates against their tactical training as platoons, companies, and battalions. Both their organization and their daily operational employment call for training in their technical and administrative roles; yet those roles are not the responsibility of the trains commander.

How then can the trains commander conduct his tactical training? March training, which is not too difficult, can be integrated into the daily operations of his units. Defensive combat is something else. The effective defense of an area (for our purposes the division trains area) requires coordinated action and must be tied in to some organizational framework. The very problems that obstruct tactical training of trains units, which must daily provide the same technical and administrative support to the combat units that they will in combat, actually point to a solution.

Key to the defense

First, the organization of the trains area is fluid and constantly changing during combat. In garrison the trains commander is seldom able to turn out his units for tactical training. During combat complete units will seldom be present in the trains area, and those in the area will be constantly changing—one section moving forward to support an advanced combat unit, a platoon running to the rear to evacuate equipment and/or pick up supplies. Thus, defense of the trains area cannot and should not be based on the organic structure of the trains companies and battalions.

However, the organization does provide a key: the on-vehicle crew weapons provided by the TOE. At some level, which varies between units and within units, a group remains with others, whether or not the group always stays in the trains area. For example, certain ordnance teams are basic and do not split up, transportation truck-platoon sections operate as a basic unit, and so on. The soldiers in each basic unit have certain prescribed personal weapons, and the vehicles in which they ride or operate have certain crew-served weapons—machine gun with ground mount, bazooka, 106-mm recoilless rifle, and the like. Individual training, of course, will be based on the soldier's personal weapon. Unit training, in the main, should be based on the wide variety of "basic units" just described. Thus an administration section, of say five clerks, who ride in a vehicle with a machine gun and ground mount as on-vehicle armament, would be trained as a machine-gun squad. A maintenance section riding in a vehicle armed with a bazooka would be trained as a rocket-launcher team. All these basic units should be trained (depending on their size) as rifle squads, sections, or platoons and learn offensive and defensive tactics, combat and reconnaissance patrolling, and other similar subjects.

Coordinated training

So far so good. But how is this myriad of "basic units" tied together, coordinated, employed, and trained? This is where the trains commander must begin to deviate from the TOE organization of his units. Sections whose function keeps them together are trained, as noted, as an appropriately armed squad, section, or platoon. Those whose field duties require them to bivouac close to one another—for example, the personnel section, the AG section, and the finance section of the administration company—would be grouped into a platoon for tactical training. If one of their "basic units" is a machine-gun squad and the rest riflemen, it would form the nucleus of a strongpoint, or a combat outpost. If these units' duties keep them habitually in the trains area, they are trained to organize and defend a section of the perimeter.

Since certain elements of division trains units are basically static the basic framework of the trains area defense is built around them. These elements can be organized into balanced sections and platoons by combining appropriate weapons squads. This can be aided by allocating appropriate on-vehicle weapons to the vehicles in which they ride. The "floating" basic units—those whose duties base them in the trains area but take them out of it irregularly and unpredictably—would be used to thicken the perimeter defense, as necessary, and to provide rifle and bazooka squads for patrolling, flushing out guerrilla groups, and conducting limited counterattacks.

Be ready to fight

It should be apparent that this concept for a tactical organization of the trains area visualizes TOE section sergeants, platoon and even company and battalion commanders assuming operational control over basic units which may not be part of their TOE organization, but which are habitually located near their primary-duty area. The problems that arise when deviating from TOE organization can be minimized by adopting as SOP a schematic layout of the trains area which can be adjusted to fit the terrain being used. Thus, even the floating elements, when in the trains area, would be habitually within the defense sector of the same static-unit commander and would report in and out to him or his representative. Static or floating elements whose normal area is central would constitute the mobile forces drawn upon to thicken (reinforce) defense sectors covering the more dangerous avenues of approach, or to conduct patrols and limited counterattacks.

How does this concept fit into the trains commander's training problem? Essentially, it gives him a great deal of flexibility. Instead of having to make the entire quartermaster company or the ordnance battalion's entire headquarters and main support company available for training at one time, any number of basic units that can be released for tactical training simultaneously can be effectively trained. By coordinated planning and scheduling, basic elements that by SOP will be under the tactical operational control of a leader from another TOE unit could be released for training under that commander.

In summary, the need for effectively training the infantry division's trains units in defensive tactics and in limited, offensive attack, combat and reconnaissance patrolling is immeasurably increased by the impact of atomic warfare. For both training and actual operations, the trains commander must establish and use an SOP layout for his trains area, and have a tactical unit that is both flexible and trained to fight.

The Revolution in Weapons Development

The best counter to obsolescence is single management from womb to tomb

MAJOR GENERAL JOHN B. MEDARIS

A second Industrial Revolution is occurring within the Armed Forces. It is a revolution in concept and execution related to weapons systems. Its compelling force is the speed of technological advance.

Science and inventiveness supporting the military needs move forward so fast that the question of obsolescence assumes primary importance. Obsolescence is that time when a weapons system is no longer a battlefield asset. A weapon is not obsolete if it can live in the battlefield environment, if it is not excessively vulnerable, and if it can perform the mission for which it was designed.

When a weapon becomes a handicap rather than an asset, when the defensive forces which can be brought against it will certainly defeat it, then it is obsolete. To the degree that the manpower, economic waste or casualties involved in its use are more costly than the results it achieves, the user suffers from its continued employment.

To put it another way, if a weapon has but one chance in three of getting through and if the three which must be sent to accomplish a mission cost more in manpower and resources than it costs to repair the damage they inflict, then the use of that weapon is at least a technological casualty if not a military casualty.

Avoidance of obsolescence demands a telescoping of the normal time span between design and deployment of weapons systems. A weapon as complex and as costly as a long-range ballistic missile should have a minimum operational life of five years. Accepting that premise, we begin to understand why revolutionary change is not only desirable but inevitable. We can no longer employ the functional approach in development, production, storage and issue and the use of weapons because that procedure assigned the responsibility for each functional area to a different individual and his contribution was sequential to another.

ABMA as a pattern

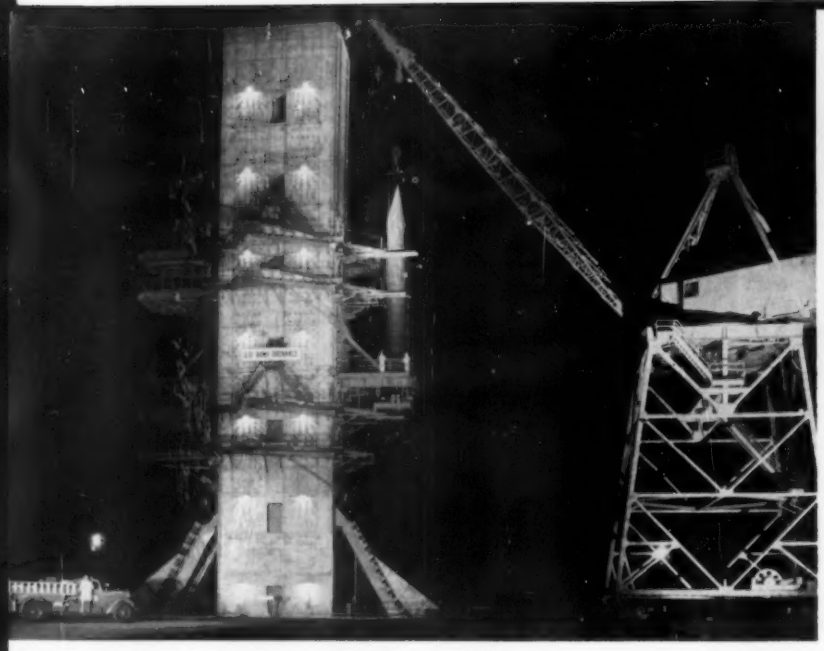
Traditionally a weapon was developed and then tested. If the using service liked it, production was initiated. Then troops were trained to use and maintain it. Next, the weapon was deployed and finally, after many years, arrived at the useful phase.

The lightning-like succession of major scientific breakthroughs occurring in recent years compels the adoption of a "crash" program as the normal schedule for modern weapons. That, in turn, dictates the following radical departure from tradition:

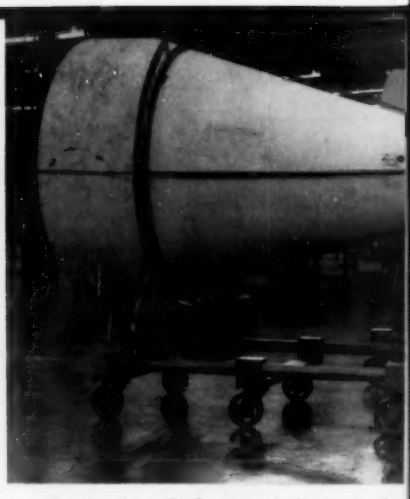
¶ There must be a single direction of a weapons program from conception until delivery to troops.

¶ All functions involved in the provision of matériel must be related to a single, coordinated plan.

Major General John B. Medaris, commander of the Army Ballistic Missile Agency at Redstone Arsenal, Alabama, enlisted in the Army in 1918 and was commissioned in the Infantry in 1921. After transferring to the Ordnance Department he resigned in 1927 and accepted a commission in the Ordnance Reserve. He reentered the service in early 1941.



Design & development. Redstone missile in the static test stand at Redstone Arsenal



Production. Redstone missile in final a

Weapons design, order to avoid the

¶ From beginning to end, the management of design, development, procurement, production, storage, issue and maintenance must be treated as a single problem.

These concepts have been observed in the organization and operation of the Army Ballistic Missile Agency where their validity and practicality are being demonstrated.

From the laboratory to the makers

One ABMA departure from custom brings the industrial people into the picture from the beginning. All procurement, contracting, and administrative actions required to support the development of a missile are handled by the Industrial Operations Division. When the project is ready to move into production, this Division is thoroughly prepared to remove the items concerned from the laboratories without disturbing the developers.

A third sequential approach is undertaken by the Support Operations Division which is responsible for fielding the weapon, for storage, distribution, issue, maintenance and technical service support. This influence, too, is in the project from the beginning, influencing the design of support equipment and determining maintenance feasibility.

The fourth major segment, the Training Division, also participates from project inception. Primary responsibility for training doctrine, methods and readiness of field units rests with the Commanding General, Continental Army Command. The close integration of time schedules required for early availability of new units compels the closest integration between the developer and the training agency. Thus the knowledge of ABMA must be available in the formulation of all plans, and the equipment and skills of the Agency must be used for early transfer to military units. The Training Division establishes and maintains the closest liaison with training elements of CONARC and the Artillery and Missile School at Fort Sill. It supervises and controls early training of units carried out at the Agency and this now encompasses the first fully integrated field artillery group for the deployment of the Redstone missile system.

Coincidental execution

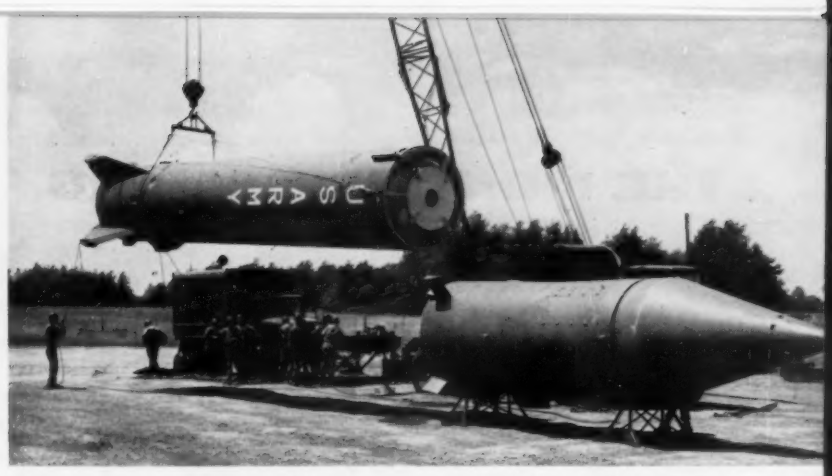
Under one roof and one command, therefore, are the approach to the weapon, the weapon system itself, the organization and training requirements to support it. All these factors are really sequential in nature. Under the ABMA concept, they are coincidental in execution.

Because of the complexity of these systems, they have an impact on all or most of the technical services and arms. These are represented in the Mission staff. Artillery uses the Redstone system. Engineer, Signal, Ordnance support the system. Transportation also plays a part. To insure that all interested elements are kept in focus and will not be overlooked, a Military Applications Board was established. Its head is a senior and experienced artillery officer. This Board presents the Agency's recommendations, representing all elements, to Department of the Army and CONARC.

Management operates through a Control Office which has engineered a system of planning, mapping, monitoring, evaluating, translating and controlling the efforts. Operators develop their own plans and budgets but the Program Branch of the Office monitors the planning, other branches conduct reviews and analyses. The objective is to keep the overall activity on course.

The procurement activity proceeds on the premise that

mbly line at Chrysler plant near Detroit



Delivery to troops. The 217th FA Missile Battalion (Redstone) in training at Redstone Arsenal

production and delivery must be telescoped in time in obsolescence imposed by speed-up of the new technology

it is a result, not a cause, and that it must have a purpose and be related to the total plan. Procurement methods and means, their timing and emphasis, whether on speed, cost, production or flexibility, are selected with a view to the plan and integrated with the schedule.

Production hand-in-hand with development

A production capability is developed at the outset. Most essential components are fabricated at ABMA, some are developed at the Jet Propulsion Laboratory of the California Institute of Technology. Guidance components are obtained from the Ford Instrument Company. At the prototype stage the Agency's sources are reviewed and components fabrication is expanded within contractor plants. To Ford Instrument is assigned responsibility for the complete guidance system and to the company goes what we developed in the laboratories. The agency looks to Chrysler Corporation, the prime Redstone contractor, and to Reynolds Metals Company for ballistic shells.

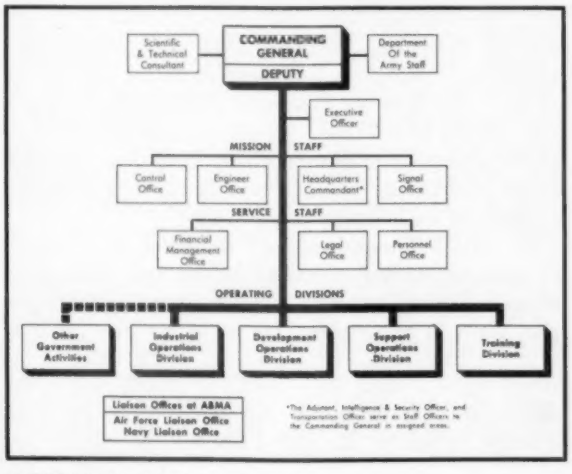
Initially missiles are assembled in the Agency's shops. But contractor engineering organizations enter in the period bridging development and production. This helps them to prepare for production. It relieves the Agency scientists of engineering tasks by farming out engineering service contracts in the development period. When the process of phasing over to the prime contractor begins, the subcontractor complex built up in the procurement of components is also turned over to him. This saves him lead time and assures sustained quality. As Chrysler begins assembly, the ABMA bows out and the development organization is free to take on new projects.

To minimize delay, basic contracts allow for change orders of greater than normal latitude. A technical representative of ABMA is placed with the contractor. He has authority to direct changes through the contracting officer. With all three talking it over, there is no reason for delay.

The entire organization is responsive to the Program Review Board; you might call it the "board of directors." It is headed by the Commanding General or, in his absence, by the deputy. Anyone desiring to change the original plan must come before the Board and prove his case. If it agrees, he gets the money, men and materials.

ABMA is in business to meet a deployment date. That has been the goal since it came into existence on 1 February 1956. The payoff is that all interim dates on the original schedule have been met.

ORGANIZATION OF ABMA



THE MONTH'S READING

Don't Desert Your Ideals

GEN. MAXWELL D. TAYLOR
Address, Graduation Exercises, USMA
4 June 1957

I shall suggest only one last bit of gear for your graduate's hope chest. Take along a material reminder of West Point—the coat of arms, a picture of the Plain with the Chapel rising aloft, a copy of the Cadet Prayer to hang on the wall. Some such token may serve you well at a time of discouragement when you are finding life in the Service at variance with what you learned here. As Superintendent, I often received letters from young graduates conveying a tone of disillusionment over the absence in a world of things-as-they-are of the "honest dealing and clean thinking" inculcated at West Point. Perhaps the Academy itself must accept some responsibility for such a frame of mind. The Corps of Cadets is an unusual society deliberately designed to foster character and leadership. In a sense, the cadets live in a laboratory which operates under special conditions to accomplish special purposes. The Army, by contrast, is a cross-section of America, an unconditioned environment neither better nor worse in its individual members than the Nation from which they are drawn. The virtues taught at West Point are the virtues of the good people whom you will find in the Service. In an ideal world they would be the ideals of all people. In the world-as-it-is, they are in desperate need of propagation. It is a desertion of a great cause to put aside the ideals of West Point simply because they sometimes feel like an out-of-season hat which makes the wearer feel uneasily conspicuous.

Responsibility Makes the Officer

ROBERT R. BRUNN
The Christian Science Monitor
18 June 1957

. . . the Cordiner Report was a beginning toward more professional, permanent forces, less weakened by the fantastic and costly turnover of personnel. "Professional" seems to be the over-all answer to the problem. Keep them in. Cut down in quantity for quality. And it isn't old-fashioned, is it, to emphasize the qualities of dedication to ideals, loyalty, duty, and restraint?

Walking through the barracks of the 101st Airborne Division, this writer met the sort of officers at work that the services need badly. Lieutenant Colonel Edwin H. Patterson, for example, was interested in everything the men were doing, from letters from home to the latest decoration in their recreation room. And he asked personal questions that showed a real devotion to the men as individuals. Responsibility, not just authority, makes the ideal officer. And an outfit like the 101st recognizes this and hand-picks its officers to be sure they are this type.

In 101st living quarters there was an effort to replace home with something that looked like home. The men eat at individual tables with linen. There is color and comfort. The Army is recognizing that the day of the raucous top sergeant and the lye-smelling barracks is gone. Not that these men aren't trained hard; they are.

Also at large, the Army is working on the personnel problem: giving special promotions to outstanding officers; working on the ever-shifting life of Army personnel to lengthen tours when possible; and making more warrant officer grades which will enable some high-ranking noncoms to make as much money as a major. Also, career specialization is on the increase, which allows experts to remain in a given field and build a sense of individual worth.

And Service to Country

HARLAN MILLER
The Ladies' Home Journal
August, 1957

How often I've found a $7,000 colonel the equal of a $35,000 executive, or a $10,000 general as brilliant as a $50-000 tycoon! My answer is like John Marquand's: Military men unconsciously care less for money, more for glory.

Illusion about Disarmament

WALTER MILLIS
Disarmament: A Dissenting View
The New York Times Magazine
28 July 1957

An . . . illusion which has clouded all efforts at disarmament is that armaments are themselves the cause of war. The syllogism is persuasive: wars cannot be fought without arms; arms therefore make wars possible; any reduction in armaments will therefore reduce the chances of war. Once more, the experience of the 1914 period lent some validity to this thesis. It seems to have been the overgrown armaments of Europe which, more than any other factor, rendered the political crisis of 1914 insoluble and so produced the holocaust that ensued.

In 1870-71 Europe withstood the shock of a Franco-German war without a general disaster; and if the armaments had not subsequently grown so great the catastrophe precipitated at Sarajevo in 1914 might not have occurred or might have been less catastrophic. Yet the size of the armaments was surely only one factor contributing to the disaster; while in the still greater disaster of 1939-40 there is reason to believe that it was not the size but the im-

balance of armaments which was mainly responsible.

In 1914 all were armed to the teeth and a calamity ensued. In 1939 the Germans were armed, the rest were not, and again a calamity resulted. It is difficult to argue from history that the armaments were themselves the causes of these disasters; it is even more difficult to argue that any reduction of armaments, regardless of the political setting in which it takes place, is itself a contribution toward peace.

What Makes a Missile?

TOPICS OF THE TIMES
The New York Times
28 July 1957

Recording one of the great battles of the Trojan War, when the Greeks had been driven back to their ships and were fighting behind a trench and a wall against an offensive led by Hector supported by Zeus himself, the poet of the epic affair writes:

"Now so long as it was morn and the sacred day was waxing, so long the missiles on either side struck home and the folk kept falling."

(Iliad, book XI, lines 84 and 85. Translation of Prof. A. T. Murray of Stanford University in the Loeb Classical Library.)

The missiles referred to here were in a sense guided missiles, for they were carefully aimed by spearmen, bowmen and slingers. In a sense also they were ballistic missiles, for they were launched by a single impulse and after that followed the trajectory marked out by the propelling force and the elevation. Missiles thus appear to be the oldest as well as the most modern weapons.

The missiles favored by the chiefs of staff of the Greeks and Trojans—Agamemnon, son of Atreus, and Hector, son of Priam—were spears, arrows and stones. In a typical encounter the warrior would first launch his spear, an ashen shaft with a sharp point of "pitiless bronze." This might pierce the shield of his opponent—seven layers of bull's hide with bronze supports—and wound him fatally or it might be turned aside. If it struck in a spot unprotected by shield or armor then the man "fell with a thud and his armor clanged about him." If the hero cast a spear and missed he did not hesitate to pick up a rock—the bigger and more jagged the better—and hurl it, hoping to overwhelm his enemy. Arrows from strong bows—and the bow of a hero like Odysseus could not be strung by any ordinary man—were favorite missiles. They could let fly secretly from any quarter and might catch the stoutest warrior unawares. Slingers kept in the background, but added their missiles to the fray. In the battle for the ships Homer says the missiles fell like snowflakes, which suggests that Greek slingers were pelting the enemy with small white stones.

While the early Greeks knew a great deal about the use of missiles in warfare, later Greeks became interested in atoms. They never reached the point where they could attach an atomic warhead to a missile, which was to be one of the great achievements of modern man. The atom of Democritus and Epicurus was a harmless bit of matter. When Roman Lucretius got hold of the atomic theory atoms were used to explain most of the mysteries of the physical world, but they had nothing to do with weapons. And by that time missiles were not so important in warfare. The Roman legions preferred close encounter and the terrible sword. Roman armies overpowered the missiles and thrusting spears of the Greek phalanx and went on to conquer the world. But missiles of various kinds were stock in trade for all armies until artillery and firearms came into use.

Missiles of the simplest kind were capable of determining the outcome of great battles and the course of history. The first Persian host which set out to conquer Greece had very effective missiles in a cloud of arrows—so great a cloud, it was said, that it hid the sun. ("So much the better," said the Spartan general, "for then we can fight in the shade.") If instead of these primitive missiles Persian Darius, King of Kings, had had some modern missiles based on the Asian shore, shooting across only 200 miles of the Aegean Sea, he could have reduced all Greece to rubble in a few hours. Western civilization would have been finished before it got well started. Western civilization has not only survived but made great progress in missiles as in everything else. It now faces a great eastern empire, far stronger than the old eastern empire of Persia. This new eastern empire is understood also to have made great progress in missiles. The question now is "to be or not to be," for the "slings and arrows of outrageous fortune" have become missiles of outrageous power.

. . . render unto Caesar

Hdqrs. Dept. of Virginia and North Carolina
Fort Monroe, January 13, 1864

J. L. Dozier, E. H. Beazeley, and others, the representatives of a sect calling themselves "Christians," in Norfolk and Portsmouth, who petition to be excused from taking the oath of allegiance and doing military duty:

Gentlemen: I have read your petition to General Barnes, setting forth your objections to swearing allegiance to any earthly government, in which you therein establish, to your own satisfaction, three points:

First. That government, although an evil, is a necessary one.

Second. That for a time it is permitted to exist by the wisdom of Jehovah.

Third. That the time of its existence at which a period is to be put to its existence is not yet come.

Therefore [you] ought to swear allegiance to the Government of the United States:

First. Because, although an evil, you admit it to be necessary.

Second. Although an evil, you admit that it is permitted by the wisdom of Jehovah, and it is not for His creatures to question the wisdom of His acts.

Third. You only claim to be excused when Jehovah's government is substituted, which period has not yet arrived.

I have the honor to be, very respectfully, your obedient servant,

B. F. BUTLER
Major-General, Commanding

Tactical Atomic 'Facts' Aren't Immutable

Like a batsman ready for either a high, hard one or a sneaky, slow curve, we must be loose and flexible in our tactical thinking, lest today's "fact by agreement" becomes tomorrow's cliche of disaster

Lieutenant Colonel Robert M. Walker

OUT of the great debate, inside and outside the military services, on the need for far-reaching changes in our organizations and tactics, there seems to be emerging the belief that we can prepare for an atomic war by neatly and conveniently reorganizing on a basis of certain mutually compatible stipulations: that is, facts on which all of us agree.

Here are some of these Facts by Agreement: ¶ The proper organization and size for the tactical unit is one that is no larger than a beefed-up battalion-size unit. ¶ Only a comparatively limited number of atomic weapons will be available for use in battle. ¶ Dispersion must be among but not within units of such size. ¶ The ultimate in tactics is to cause the enemy to create a target for our atomics while we take care not to concentrate so that he can retaliate. ¶ The tactical atomic weapon must be treated as merely an extension or amplification of conventional fire power. ¶ The dangers of radiation fallout may reduce the number of nuclear weapons that are used. ¶ The principles of war remain unchanged, but must be modified in applying them on the atomic battlefield.

Some of these premises are self-evident; others appear to be reasonably conjectural; still others may be dangerous and deserve critical examination. The proof of any formation or organization is its success on the battlefield, not a determination of its potential by armchair philosophy, academic discussion, or even slide-rule calculations.

But the greater danger in these Facts by Agreement lies in their transitory nature. The "facts" of today must never become so fixed that they stultify flexibility and eventually reappear as mistakes tomorrow.

By applying the use of atomics to various battles of the past, we may gain a clue to the linkage between mass-destruction weapons and various formations and tactics.

For example, in Braddock's defeat in 1755, atomic weapons would not necessarily have influenced the outcome. At least, considering the dispersed guerrilla-like tactics of the French-Indian force, they would hardly have assisted Braddock in turning defeat into victory.

Most modern military students glibly recite the expected battlefield effects of the atomic weapon. We speak of digging in, dispersing, massing of force within the limitations of time rather than in the World War II pattern of comparatively slow build-up. We acknowledge the need for surprise, and that the atomic weapon will force us to change from the position defense to the mobile. Above all, we accentuate the fact that we must discard the cumbersome divisional organization of the past and organize into mobile combined-arms groups.

Under the assumptions we have

Lieutenant Colonel Robert M. Walker, *Artillery,* served two hitches as an enlisted man before earning a commission in 1942. He was integrated into the Regular Army in 1946 and is now on the faculty of the Command and General Staff College.

made in our Facts by Agreement it would appear we are on the right azimuth. Now *if* the atomic weapon is only an extension of present fire power, and *if* only a limited number are available to the combat commander, and *if* the enemy is as concerned as we about creating dangerous fallout, we are probably right.

But what if unlimited stocks of atomic weapons are available? What if fallout is rendered harmless by the use of antiseptically "clean" atomic weapons?

We must admit that the development of atomic weapons will not cease, or become static. Progress will continue to be made in two directions:

toward megaton-yield weapons and toward the soldier's individual atomic weapon.

If fallout is controlled, two major objections to the tactical use of atomic weapons will be eliminated. First, the threat to civilization from overly radioactive atmosphere will be ended. Secondly, the chance of a tactical atomic war growing into a world-wide nuclear conflagration will be reduced. "Clean" atomic weapons will be localized to battlefield effects.

The next agreed-upon "fact" we should examine is the assumption that the reinforced battalion-sized unit will be the basic unit of maneuver and fire in atomic combat. Why? If one weapon can eliminate a battalion-sized unit, then wouldn't nine weapons eliminate an entire division's battalions? In a time of atomic plenty any unit that reveals itself may well be a lucrative target because of size, armament, transportation, or even its position as the enemy sees it. A company or platoon might be a worthwhile target if its tactical position is a critical threat to the enemy.

In a mobile defense we use maneuver with fire and terrain to seize the initiative. The use of battalion-sized battle teams would result in strongpoints and lightly held intervening areas which, of course, would be defended by fire and, if necessary, by maneuver. We expect this to force the enemy to concentrate either against one strongpoint or between strongpoints, thus offering a worthwhile atomic target.

Do not the protagonists of mobile defense appear to ignore the fact that our own potential enemy has the same atomic battlefield capability that we have?

How would *we* attack such a defense? Certainly, in an atomic situation, one method would be by atomic strikes on several adjacent strongpoints at the same time. These strikes would be exploited by attacks from the most dispersed formation that is possible, while holding other atomic weapons ready to strike any counterattacking formations. To expect the enemy to fail to consider these same things is to underestimate him.

The tactics we use—and, to a major extent, the strength of our strongpoints in a mobile defense—will depend on the units we use. In the ultimate picture, *the unit we employ must be the one next smaller in size to the one which provides a lucrative atomic target.*

Obviously this will depend upon what weapons are available. If and when weapons become so plentiful that even a dispersed battalion-sized unit becomes a worthwhile target, the company—and perhaps the platoon—will rise phoenix-like from the tactical fireball as the largest battlefield unit of fire and maneuver.

The tactics that led to the defeat of Braddock may well reappear as the final step in this evolutionary pattern.

Undoubtedly there will be geographical limitations on the use of atomics on the battlefield. Features of strategic importance—for example, a canal forming the only waterway across an isthmus connecting two continents—will not be destroyed by atomics unless the possession of it is strategically unimportant to a contender.

The capability possessed by at least two major powers of destroying each other's population centers, and which neither can prevent, makes it unlikely that any war, conventional or atomic, can be brought to a satisfactory end.

Does this mean that we should cease reorganizing for atomic war? Shall we discontinue studying the past in applying the tactics of the future?

Certainly not. More than ever we must turn our efforts toward arriving at organizations and plans which permit the greatest likelihood of winning with *today's* weapons any war we must fight *today*.

We have no choice. The atomic fancy of yesterday is the tactical fact of today. Our freedom of action depends upon developing and continually modifying our ability to use what we have or will get to the fullest advantage.

We must be flexible and able to change as weapons and times change. The ability to win any type of war at any stage of weapons development is our surest insurance against being forced to wage it.

Finally, the temporal assumptions upon which we base today's plans must be held doubly suspect. Tactics and organization must be revised as circumstances require.

All Facts by Agreement must be constantly viewed with suspicion, and never be permitted to assume an aura of permanent truth. The Fact by Agreement that can no longer be challenged may well become a permanent Cliché of Disaster.

HOW good is the helmet in combat? Is it really worth wearing? Or, as some authorities suspected after World War II, is it a rather costly nuisance—capable of preventing so few casualties that the Army is foolish to issue it?

Until recently, these opinions had to be answered primarily on the basis of opinion. But now the Army has scientific evidence—the result of a study done by its Operations Research Office, a group of The Johns Hopkins University scientists.

The researchers began by assembling information about the causes of casualties. They wanted to know what kind of projectile hit a man, where it hit him, and how badly he was hurt. You may ask why they didn't just set up a few dozen M1 helmets on a firing range and have at them. Such a test would not come close to the conditions of actual warfare. If you want to learn the value of Army equipment, there is no testing laboratory nearly so good as combat—and the casualty records of this century's wars, particularly World War II, provided just such a laboratory.

A study of World War II casualty data brought out these important points:

About 70 per cent of the total wounds among ground troops were caused by fragment missiles; the remaining 30 per cent, by bullets and other causes.

All missiles (fragments and bullets) struck the various parts of the body in proportion to the regions' mean projected areas, the average amounts of surface open to a hit, with one exception. This was the head, face, and neck region which suffered twice as many hits as would have been expected.

Notice Table I. The figures in the first column come from Burns and Zuckerman, two British leaders in the field of wound ballistics during the last war. These men took into account three different body postures—standing, kneeling and prone—and then estimated the mean projected areas of the different body regions.

There are two possible reasons the head gets hit so often: first, it is a preferred target for aimed fire; second, it is more exposed than the rest of the body. Two investigators of the Bougainville campaign found that the second factor—exposure—was by far the more important. In this campaign, head wounds constituted twenty-eight per cent of all casualties. This was a little higher than the World War II average for the infantry. Also, the frequencies for rifle hits and mortar hits, which involved the head, face and neck region, were identical (twenty-eight per cent) when based on the total hits of these particular weapons on all regions of the body. The frequency of head hits from all weapons exceeds the expected number, based on the Mean Projected Area, by 133 per cent.

On the basis of mean projected areas the head, face and neck is twelve per cent of the body. But on the basis of wounds received by infantrymen in World War II, the head, face and neck region represents twenty-one per cent of the total body area exposed during combat. Actually, it represents an even larger area than that because the helmet was regularly worn in combat and stopped a number of hits that otherwise would have resulted in wounds. The ORO investigators found that the true figure was about thirty per cent. Thus, nearly one third of the human target in combat is the head.

To estimate the helmet's usefulness in saving men, the ORO group collected information about hits sustained by the unprotected parts of the head—that is, the neck and the face. Some of the data are shown in Tables II and III. It appears that head hits among the infantry occur in this proportion: 1 (neck): 2.7 (face): 3.1 (cranium). In other words, the cranial region, protected by the helmet, suffers 1.2 times as many incapacitating hits as the face.

Helmet stops 54 per cent of hits

However, the area of the cranial region is actually 2.6 times that of the face, and, if it were not for the helmet, would be expected to receive 2.6 times as many wounds. Since it actually receives only 1.2 times as many, the proportion of hits stopped by the helmet in the region it covers is fifty-four per cent.

What does this figure mean in terms of savings of total wounded? Well, it was found that the cranium sustains 9.6 per cent of the total hits on the body (since it suffers 3.1 times the hits received by the neck, and the neck represents 3.1 per cent of the total hits on the body).

But the helmet stops 54 per cent of the hits so if it were not for the helmet, the cranium would be expected to sustain 9.6/0.46 or 21 per cent of the total hits.

This means that for every 100 men wounded (with helmet), 9.6 men received wounds in the cranium. Without the helmet, it would be expected that 11.4 more men would be

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Norman A. Hitchman is associated with the Army's Operations Research Office, a group of The Johns Hopkins University scientists. He acknowledges the assistance of Mr. Herbert Yahraes in preparing this article.

TABLE 1[a]
COMPARISON OF PERCENTAGE DISTRIBUTIONS OF MAJOR WOUNDS

Region	Mean Projected Body Area	Total Hit	Killed	Wounded	Died After Wounding	Living Wounded	All Deaths
Head, Face, Neck	12	21	47	15	22	14	43
Thoracic	16	13	25	10	23	10	25
Abdominal	11	8	15	6	24	5	17
Extremities:							
Upper	22	23	5	28	7	29	5
Lower	39	35	8	41	24	42	10
	100	100	100	100	100	100	100

[a]*Battle Casualties*, by Gilbert W. Beebe, Ph.D., and Michael E. DeBakey, M.D.; copyright by Charles C. Thomas, Springfield, Ill., 1952.

Table II
COMPARISON OF SITES OF INJURY IN THE HEAD REGION
(Expressed as Percentage of Total Casualties)

Source	Cranium[a]	Face	Neck	Eyes	Ear	Total Number All Casualties
British Data						
MEF I	5.3	4.3	—	2.2	—	2,637
MEF II	4.9	7.0	—	2.7	—	4,859
BNAF	9.5	5.5	—	1.6	—	2,511
US Data—SWPA 1942-43	5.7	4.8	1.7	—	0.6	2,602
US Fifth Army, Aug-Dec 1944	6.2	5.5	2.0	(1.9)	—	14,309

[a]Wounds of the cranium are sometimes classified as head wounds. In the literature, the use of the term "head wounds" often leads to confusion since in some cases it means the scalp or cranial region and in others it means the whole head region including the face and neck. In this article, the term "cranium" will be used to designate the region of the head covered by the helmet; the other regions—face, neck, eyes and ears—can be taken to represent the unprotected parts of the head.

Table III
RATIO OF NECK, FACE AND CRANIAL WOUNDS

Source	Neck	:	Face	:	Cranium	No. Cases With Head Injuries
US Data—WW II, SWPA, 1942-43	1	:	2.8	:	3.3	318
Fifth Army, 1944	1	:	2.7	:	3.1	1,954
Mean Values	1	:	2.7	:	3.1	
AEF, WWI	1	:	2.8	:	3.3	22,241
Civil War[a]	1	:	1.9	:	2.5	26,400
AEF, WWI[b]	1	:	1.9	:	4.1	41,715

[a]Classified as gunshot
[b]Single and multiple wounds based on 266,000 admissions

wounded in the head (21.0 minus 9.6 equals 11.4). On an *expected* basis, then, out of a total of 111.4 men who were wounded, twenty-one of these men would be hit in the cranium. Therefore, the percentage of wounds expected in the cranium would be 19 per cent of the total wounded. This means that the M1 helmet prevented a number of incapacitating hits equal to 10 per cent of the total hits on the body.

The estimated eight per cent savings in total battle casualties means that the helmet in World War II probably prevented wounds in more than 70,000 men. A significant proportion of these men would have been killed had the helmet not been worn.

To get the same amount of savings by protecting other regions, body armor weighing more than twice as much as the helmet would have to be provided.

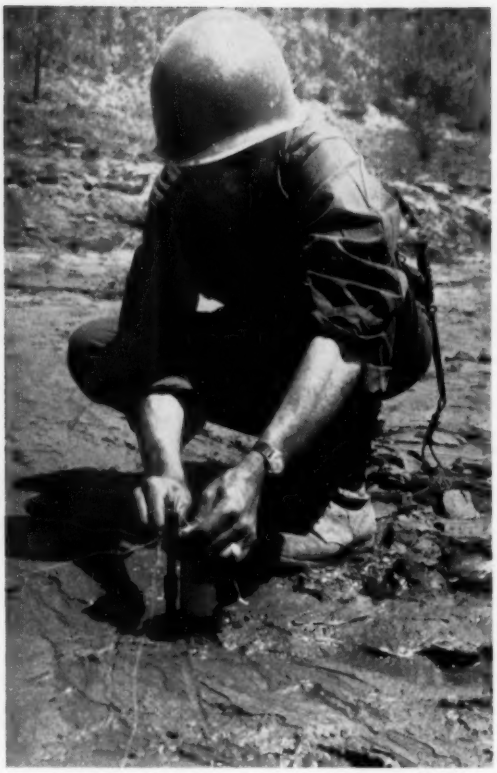
Experience in Korea

What about the helmet in Korea? A preliminary study by the Surgeon General of the Army during the period November 1950 to May 1951 showed that 94.6 per cent of wounds of the head, face and neck region for the limited number of cases studied up to that time in the Korean war were caused by fragments. Of all wounds in the head, face and neck, an average of 79.8 per cent were penetrating wounds (not perforating wounds), suggesting that a great number of missiles must have been of low-velocity type. Since a field investigation showed that a major portion of the men in this period of combat discarded helmets, it is reasonable to expect that a great number of head wounds could have been prevented if the wearing of helmets had been the rule.

ORO's study, after determining the helmet's worth on a quantitative basis, went on to show how a new helmet could be designed to provide much greater savings over the present model without materially increasing the weight. The Quartermaster General is working on a new type helmet which should be even more valuable than today's.

Meanwhile, if anyone questions the value of the helmet, tell him this: for an army entering combat without helmets, one casualty in twelve is unnecessary. Don't be the guy on the twelfth stretcher!

NUISANCE MINING



The dispersal requirements of the atomic battlefield will preclude the use of standard pattern extensive minefields. Axial mining along the routes of enemy advance can achieve the same psychological results.

CAPTAIN HOWARD L. SARGENT

SINCE World War II and Korea a dangerous dependence on minefields has developed in support of various concepts of mobile defense. If our tactical planners assume extensive use of standard minefields as parts of barriers to block enemy armored thrusts, it is possible that our battle groups will be surrounded, overrun and annihilated by an enemy heavy in armored and airborne forces using all available routes. That is a strong statement, but examination of tactical concepts and available troop and logistical effort support it.

First let's examine tactical concepts. The dispersed tactics of Pentomic battle groups suggest that gaps between units will require many more mines than were used at any time in the past.

From a purely technical viewpoint mines and minelaying have improved in recent years. However, from a tactical viewpoint we definitely overcommit our available troop and logistical effort when we assume that we will have extensive standard pattern minefields to halt any enemy attack. More dangerously, we assume that standard pattern minefields and other large defensive obstacles will be worth the effort required to emplace them. These two aspects—inability to lay large fields, and reliance on standard patterns for mobile defense—require more detailed examination of the problem.

Captain Howard L. Sargent, *Corps of Engineers,* is a 1947 graduate of USMA. From 1948 to 1952 he served in the 1st Engineer Combat Battalion (1st Infantry Division) in Germany. Later assignments were at California Tech for an MS, Korea and Japan.

Who'll do the work?

Will our engineers be able to erect extensive barriers to enemy movement? Not unless their number in a field army is greatly increased. Combat and construction engineer units will be extremely busy and in short supply. Allotting "additional battalion-days" to barrier construction will often find such works getting lower priority than other requirements.

It is agreed that soldiers of other arms must assist in minelaying. In past wars the infantry-platoon leader had to display considerable leadership to get fatigued men to dig in, erect barbed wire, and perhaps bury a few mines in the defiles leading into a position. How can he get more minelaying out of them in the future?

And how about the armored units? "*Mine*laying?" wails the armored battle group commander. "What with all this rushing around to stop infiltrations and patrolling, my deadline rate is over fifteen per cent. I'll never catch up on maintenance! On top of everything else, we gotta dig foxholes!"

Layout of the field

So it goes with the other arms. Atomic warfare has increased everyone's normal duties and decreased the minelaying capabilities of non-engineers as well as engineers. Limited close-in or "protective" minefields may be possible; completely protective or defensive minefields to bar penetrations between positions will be beyond our minelaying capabilities, unless the enemy kindly allows us many days to prepare them. To provide all-around AT defense for an infantry platoon and stand off enemy tanks at least 200 yards from foxholes, the diameter of the minefield must be about 1,000 yards. Assuming fifty per cent natural obstacles, the 3,140-yard platoon minefield perimeter will be about 1,500 yards of standard pattern containing 1,500 AT and about

3,000 antipersonnel mines. It will take a trained engineer combat company at least a day of arduous labor to emplace the required eight truckloads of mines, picking up the mines at a railhead up to a hundred miles away, hauling, unloading, uncrating and reloading; hauling to the minefield area; unloading, burying, marking and recording; and disposing of empty crates.

Or, instead of all-around defense perimeters, you can locate the minefields wherever you want them. You still have the gigantic task of mining all avenues of approach on a division front eighteen to thirty miles wide—how deep no one can be certain.

Moving them up

A typical battle group might include an engineer combat company, of which one platoon is needed to keep roads, culverts and bridges repaired and free of guerrilla-placed mines, another platoon fully committed to digging in CPs, aid stations and fire-control centers and preparing obstacles involving demolition, leaving, on the average, about one platoon available for minelaying on the 10-mile front assigned the battle group.

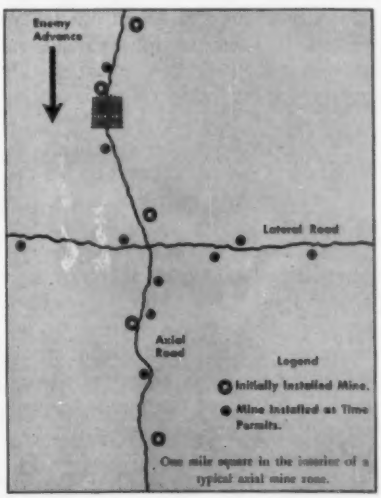
The great distances between units in mobile defense will create a demand for transportation for troop movements and normal supplies that will drive transportation officers to despair. The transport needed for tens of thousands of mines for each mile of defensive depth and for otherwise supporting the minelaying operations will cause heated discussions between G3 and transportation officers. Unless normal priorities for POL, ammunition, food and troop movements are changed, G3 will back down and the huge quantities of mines needed for extensive standard patterns will not go forward.

Defense of obstacles

So far we have examined the troop and transportation effort, and it has not been reassuring. The next question is: How effective would extensive standard patterns be if, by good fortune, difficulties were overcome and the fields emplaced?

Department of the Army policy on defense of obstacles is laid down in TC 9 (2 April 1954): "Barriers should impede enemy movement along favorable avenues of approach. . . . Limited physical capabilities may preclude coverage of an entire barrier by fire; in this case provision for constant observation and adequate communications will permit rapid shifting of mobile forces or fire support to cover threatened areas." TC 9 implies that when backbreaking effort is put into erecting barriers, defense of those barriers must be vigorous.

Since I intend to urge less effort toward standard minefields and more toward a different form of obstacle, I should first point out the difficulties involved in the mobile defense of dispersed obstacles. A dug-in force has trouble enough defending a minefield or other barrier. To require it by surveillance to distinguish a feint from a real attack, to move from its dug-in positions to new blocking positions, and finally to smash the assault without benefit of prepared positions, places a premium on luck, with the odds in favor of the attacker. A blocking action or counterattack is most successful when the momentum of the attack is dissipated through losses caused by actions like air attacks, artillery blasts or depletion of supplies and maintenance. A sneak attack through an undefended obstacle has no effect on attrition. A blocking force moving to new positions to repel such an attack will probably absorb far more of the attacker's momentum than is desirable. The attacking force, with full fuel tanks and fully supplied and maintained, will probably roll over our blocking force and slash dozens of miles, perhaps over a hundred, deep into our defending army, to join up with airborne units of corps or army size. Our ten- to twenty-mile-deep defensive zone will then be eighty miles within enemy-controlled territory. Enemy engineers can quickly establish safe lanes through our shallow obstacles, even though they be numerous, and a deluge of support elements will use all axial roads in the path of the enemy's armored elements. By using all axial roads he avoids massing his support elements in defiles and denies us a remunerative atomic target. As the ugly picture develops on his map, our army group commander orders a new barrier zone prepared 150 miles behind the old one, wondering if it will produce better results.



Depth of battle zone

All aspects considered, the mobile defense of dispersed obstacles *as a principal deterrent* is not desirable in attempting to stop a major armored or airborne thrust, especially when the great effort of erecting numerous more complex obstacles precludes the use of a defensive area more than a few miles deep.

The concept of a deep battle zone is not consistent with the technique of concentrating extensive barriers in the first ten or twenty miles of depth and for which, in the first place, the mines, time, labor, transportation, training and covering fire power will not be available. While most of us agree that we must not meet the enemy's full force in a slugfest on the MLR, many of us seem intent on stopping penetrations fairly well forward, apparently to make use of the many barriers necessary to block all axes of advance. Perhaps mobile defense tactics are being molded around barrier techniques used in the past, instead of barrier techniques being developed to satisfy the concepts of mobile defense.

General Gavin has said that "the battle zone must be as deep as the enemy can travel with fuel tanks of his armor full"—a *prima facie* assumption that it is impossible to contain a strong armored attack with fire power and obstacles, since a preponderance of the enemy's tanks can roll across country, bypassing or overcoming strongpoints and avoiding mined areas, until he runs out of gas. Therein we have both the problem and the solution.

Before offering a solution—in so far as barriers are concerned—to defense against armored and airborne attack in atomic warfare, I must digress to make one fact clear. If what I have said so far seems to be an indictment of current DA tactical doctrines, I must disclaim such intent. The Army provides tactical doctrines as *tools*, to be selected by commanders to fit their situations.

This becomes more apparent when the "solution" is discovered to be a shifting of emphasis from one tactical concept to another already accepted, but for which satisfactory matériel is not available in the field and which is distrusted by commanders and has been little used in the past.

Standard pattern minefields have their uses in large-scale deliberate defenses, as local protection, and in delaying actions where successive positions must be aggressively defended by forces too small to be atomic targets. It is perhaps unfortunate that large-scale deliberate defenses have been outmoded, except where both sides openly or tacitly agree not to use atomic weapons, and the attacker lacks superiority and armored and airborne attack capabilities. The last phases of the Korean campaign are a good example.

Axial mining

Almost complete separation of its logistical train from an enemy armored or airborne force can be effected—except for aerial resupply—by denying roads to wheeled vehicles behind the attacking forces. An approved method for accomplishing this is axial mining which has been defined by the Army as: "Continuous or intermittent nuisance mining in great depth along the axes of enemy advance. . . . A nuisance minefield is one laid to delay or disorganize the enemy and to hinder his use of an area or route. . . . Nuisance minefields are used to impose caution and to delay the enemy, *to disorganize his forces by separating his supporting echelons from his attacking echelons* and to effect a lowering in morale" [italics supplied].

Axial mining separates the enemy's assault and support elements so that the attacking echelon, though possibly deep within our defenses, loses momentum and falls victim to our counter-attacking forces. The chart shows a square mile in the interior of a typical ten- to twenty-mile-deep axially mined zone. Initially mines are spaced at intervals averaging 300 yards, more being added if time permits.

Axial mining in successive zones will prevent support vehicles from following an armored and airborne attack. By staying off roads the enemy's armor suffers some losses to mines and blocking forces as he penetrates, but substantial portions with fuel tanks almost empty will link up with his airborne forces. There he begins to feel our strangling process as supply and maintenance elements fail to appear. Near panic reigns in his supply columns far to the rear. Every road becomes a trap. Some convoys start across country but cannot average more than a mile or two an hour. Convoy commanders try to crash through on roads regardless of losses but find themselves ambushed by infantry-engineer paratroopers who can also sneak in at night and remine the route. Atomic ground bursts and other radioactive contamination stop semi-successful penetrations of axially mined areas.

Resupply of enemy airborne and armored forces is almost entirely by air for at least several vital days, thus providing friendly forces time to eliminate the salient before the enemy's fighting vigor can be restored by support elements. By using axial mining fairly extensively we will have chewed up the attacker and produced a situation where aerial resupply will probably provide him with only a small portion of the logistical support he needs.

Fire cover

Standard pattern minefields must be covered by fire because they are primarily physical barriers. Axially mined zones are psychological barriers, and need no cover. ST 5-7-1 observes that: "The effect of mines is largely mental. Not over ten percent of our casualties come from them. . . . The casualty producing effect of a mine is secondary even though it helps achieve the mine's primary function." It is psychologically difficult to advance down a road, expecting any second to be your last. It is Russian roulette on a gigantic scale, since use of counting devices allows a mine to select its victim. Even if there are only enough to knock out ten or fifteen per cent of the vehicles, no driver considers such statistics. He gets gray at the thought of *his* becoming a statistic.

A standard pattern minefield 100 yards deep and not covered by fire can be breached in a matter of hours, possibly less. Moving across a hundred yards of road that conceals one properly camouflaged mine takes almost as long. One AT mine buried off the road but capable of destroying a truck or immobilizing a tank on the road is almost impossible to detect. Therefore, though modern AT mines can be used advantageously, for extremely effective axial mining we need new types that can be concealed off the roadbed. Besides

being difficult to detect they can be installed far in advance of the enemy's attack without interferring with friendly traffic. They can be disarmed while friendly forces use the road. Now we can mine hard-surfaced roads, since no telltale breaks need to be made.

Off-the-road mining

Possible refinements in off-the-road mining might include radio control, with arming and disarming done at an army mine control center. Radio-controlled mines are not new.

A typical off-the-road mine would be buried in dense grass or brush 20 yards off the road and 200 yards from its neighbor. It would be actuated by magnetic induction (impulses from a large metallic mass or by audio frequency), by sound waves from a vehicle, or by the vibrations caused by vehicles transmitted through the air or ground. It could be actuated to fire on any selected vehicle in a column. Upon firing, it would lob one container or more carrying 100 to 500 pounds of explosive, to detonate in the middle of the road. The larger charges will discourage tanks and neutralizing parties from trying to open the road to wheeled vehicles. Occasionally a mine will cover the enemy vehicle with flaming napalm. Many will set off ordinary parachute flares simultaneously to enable friendly aerial observers to pinpoint penetrations.

Axial mining obviously would great-

Emplacement of standard pattern minefields requires many hours of labor. Melting snow exposed these rows of hastily planted German World War II mines. U. S. Army Engineers at left are searching for additional enemy mines

ly deter enemy transport. However, two faults in axial mining must be overcome before senior commanders will accept the concept wholeheartedly and give mobile defense the sieve that will allow armor moving across country to go through but delay vital logistical trains. The first is that in the past, nuisance mining has been ineffective in denying the use of roads to the enemy. Secondly, recording being poor or nonexistent, troops dread a counterattack through a nuisance-mined area. Because of this fear, TC 20 says, with respect to who may direct the use of nuisance mines: "Authority to Employ: Army commanders or higher. May be delegated to division commanders—not lower."

The reasons are easily explained. Pressure-plate type mines have to be emplaced after friendly forces withdraw. This leaves planning, emplacing, arming and recording to the last tired withdrawing elements which, like the commander authorizing the mining, consider it a last-ditch action. Effective mining can't be done under such conditions.

Hitler told the story to Jodl in describing Rommel's retreat after El Alamein: "The mining is very difficult because one can do it only behind one's self and on the retreat one doesn't have time, so the enemy sees every mine in the road."

Development of new mines permits axial mining by selected units as part of an over-all plan instead of haphazardly by the last withdrawing elements. Off-road mines can be buried weeks in advance. Giving the entire axial mining mission to specially trained units as a full-time job is the solution.

The first steps must be made in research, development and production on a priority basis to put new mines in the hands of axial-mining units. Probably much research has already been done. Practice, dummy and live mines should be produced simultaneously, so that training in installing them can be commenced as soon as practicable. In future maneuvers Aggressor forces should become used to encountering practice mines which emit a puff of colored smoke. Such encounters will instill confidence in the system.

Train the units now

As soon as limited production is begun, engineer mining-and-demolition battalions should be activated and trained intensively in axial mining techniques and demolitions. They should have no other mission, for axial mining is a full-time job in defense and attack.

In the assault these units will shore up the advance against massive enemy counterattack by establishing new axial mine zones just behind our attacking troops. When friendly forces counterattack through our own fields, mining and demolition (M&D) units provide guides to disarm mines.

When field tests and maneuvers establish how many hundreds of square miles of axially mined area a mining-and-demolition battalion can lay and control (estimated maximum is 1,500 square miles), steps can be taken to compile TOEs and to train more units.

M&D units must not be burdened with the heavy construction equipment found in other engineer units. A typical squad would have a good radio, a cargo truck with 2½-ton trailer, two jeeps with trailers, a demolition set, and little else.

Axial mining and the creation of barriers in great depth at the cost of surprisingly low troop and logistical effort per square mile of mined area offer a made-to-order, valuable and workable tool for the mobile defense. At a reasonable cost we can make use of the roads in our combat zone dangerous to enemy support elements. To give ourselves combat effective axial mining capability within a year we must devote considerable initiative and priority to development, organization and training now. Because axial mining is not susceptible to air interdiction like other barriers, and hence will partly counteract our lag in the air-superiority race, even a crash program that cuts across normal organization lines would be appropriate. As General Blakeley critically summarized the dismal past: "We didn't use mines very skillfully during World War II or the Korean campaign."

Must it always be that way?

THE MONTH'S CEREBRATIONS

PERMANENT MARK OF THE MARKSMAN

COL. REYNOLDS CONDON

NOT too long ago a soldier's ability to shoot straight was considered extremely important. Today, much less emphasis is placed on skill in individual weapons; and in certain criteria for promotion, arms qualification is well down the list of desirable capabilities.

There remain some old fogies who don't like this. Holding tenaciously to the teachings of their youth, they are convinced that when the going gets tough, the rifle is the soldier's chief reliance. They would like to see our Army return to its traditional standards of deadly marksmanship.

The elimination of incentive pay for excellence in marksmanship has taken from the average soldier any aspiration towards excellence in shooting. The pay increase that amounted to nearly twenty-five per cent was a tantalizing carrot to dangle before the eyes of a $21-a-month private. Nor was the extra five dollars scorned by underpaid noncommissioned officers.

To spur individual effort we now offer no more than marksmanship badges. The great potential prestige value of these marks of excellence is rarely exploited. Few officers wear them, with the natural consequence that the enlisted man generally regards his more as a trinket than as a hard-earned award. In some units marksmanship awards are held in such light esteem that badges are not even requisitioned. (Heartening note: On page 88 of the May *ARMY* the Commandant of the Army Infantry School proudly displays his Expert badge.)

There is a way to revive interest in marksmanship, and at far less cost than the old incentive pay. It can also be even more effective.

We can present to the new expert the rifle with which he qualified, mount upon it a suitably engraved and conspicuously positioned plate, and make the presentation with ceremony. Members of all components, and of all grades, should be eligible to earn this award.

Several benefits can be gained. Interest in skill at arms would soar. The expert would carry the same rifle throughout his Army career, and its possession would identify him. Upon leaving the service he would have in his home (no doubt prominently displayed) a constant reminder to himself and others that he is a soldier, and a good one. Possession of his own rifle would tend to influence the owner to participate in local shooting-club activities, to the public benefit. It is conceivable that weapons in the hands of competent citizens, in all sections of the land, could some day again prove a military asset of vital importance to the nation.

Excellence with the pistol should equally be recognized. If a man qualifies as expert in rifle and pistol, he should be presented with both.

***Colonel Reynolds Condon,** USA, retired, is a 1927 USMA graduate who has commanded field artillery and infantry units from platoon to regiment.*

WEAR YOUR HELMET ANCHORED

LT. COL. CHARLES R. CAWTHON

ONE of the more fallacious bits of so-called battle lore, I believe, is that the helmet strap buckled under the chin subjects the soldier to the risk of a broken neck. This misfortune purportedly can result from the force with which the helmet may be blown off by the concussion of a shell exploding nearby.

In Korea I noted that a new buckling device, apparently designed to give way under pressure, had been added to the strap, so the broken-neck theory must have official recognition.

Mankind through centuries of practical work with the noose has undoubtedly collected a mass of data on the force required to stretch the human neck. I don't have the data, nor any idea as to how close one must be to the burst of, say, a 155, to get a lift under the helmet comparable to the force of a fall through the trapdoor of a scaffold. However, I do know from first-hand observation—reluctantly enough performed—that a broken neck is only one of the fatal injuries a soldier can acquire from a shell landing close enough to blow off his helmet. In fact, the chance of a fatality resulting separately from such a blow is rare enough to be disregarded.

My World War II division wore the chin strap buckled—a practice so different from the rest of the Army that it became a unit tradition. I believe our people were close to as many shell bursts as any. Casualties normal to such a business resulted, including some greatly injured sensibilities, but I never heard even a rumor of a broken neck from a soldier having been hoisted by his chin strap.

While I am convinced that there are no valid reasons for not employing the strap in the way it was attached, I think there are at least two good rea-

sons for wearing it the right way.

The first is that balancing some two pounds of metal on your head, while trying to run, crawl or climb, restrains movement, unless the weight is firmly anchored. If the helmet is worth wearing at all, wear it securely, for on the ground it is just another hunk of metal. The more violent the action the more it is needed for protection, and at such a time is more likely to fall off. The period spent in recovering a helmet is time wasted and can be fatal to the owner. This, aside from the value of division tradition, is the reason our division commander exerted considerable moral suasion to keep his men buckled up in World War II. No soldier of my wartime division is likely to forget the singlemindedness of purpose required to enforce this regulation, and I believe few will now question its value.

The other reason for wearing the chin strap buckled—and this is my own view—is that a soldier wearing the helmet unbuckled looks about as martial as a tomcat with his head in a can of salmon.

I agree with the principle that the helmet is for protection and utility and not for glamor. Therefore I hail our current model, for it affords protection, is without peer as a field wash basin, and has the military dash of a thunder mug. With the strap hooked around the back and the tab protruding it looks like an inverted pot with one handle broken off. With the strap dangling (and I never see this without sadly recalling the fate of men so appearing in my division) it looks as though the handle had rusted through the middle.

On the other hand, it seems to me that our utilitarian helmet with strap buckled and in place on the point of the chin may not be as photogenic as its ancestor worn by the Roman legionnaire, but it does have some appearance of distinction. I think the practice is of value for that reason.

Lieutenant Colonel Charles R. Cawthon, Infantry, *served with the 29th Infantry Division in World War II, and later at Sixth Army Headquarters. He is now with Allied Land Forces, Central Europe. He wrote "Giving Name to Fear" (August 1950) and "Battlefield Offenses" (June 1951).*

IS THAT PAPER NECESSARY?

COL. H. E. ALPHIN

PAPERWORK and non-essential administration are not only expensive, but they reduce our fighting effectiveness. We expend millions of precious man-hours in preparing, processing, reading and filing papers. This appalling waste is inexcusable during peacetime, but more deplorable in wartime when every man's effort is vital to victory. If we do not streamline administration now, we cannot expect to do so in the thick of an emergency. Our administrative burden is not confined to personnel matters or adjutant general activities, but embraces all staffs, branches, services, and command echelons. A large part of the paper empire, from company level up, concerns supply, training, communications, procurement, maintenance, transportation, storage and distribution.

Few of us realize that the average field army has about 48,000 paper shufflers who use about 18.5 per cent of its vehicles, 41 per cent of its housing, and 14 per cent of its tonnage. We can do without this mountain of paper and accompanying actions. While some paperwork is essential for administrative effectiveness, much of it is a millstone around our necks.

Many factors brought about this condition. Various reports, forms and summaries are retained because they are nice to have, or are held in file just in case someone might call for them. Sometimes a considerable volume of non-essential paperwork is maintained by an overzealous empire-builder in an attempt to justify his position.

Our primary concern, then, is to reduce the size of this ever-growing colossus. The solution is not an easy one. It would be simple for the Secretary of the Army to publish an order discontinuing certain procedures, reports, forms, regulations and certificates. However, our system is so complex that each directive or form must be evaluated for its essentiality. Every person, from company clerk to army chief of staff, can help to chase paper or cut red tape.

We must ask ourselves if *this* paper or administrative action is really necessary. Non-essential records must be destroyed instead of being initialed and filed, and we must recommend elimination of any non-essential action required by higher headquarters.

Here are some actions that should reduce the paper burden. Publish or prepare only forms and reports that are positively essential. Delegate responsibility for control and corrective action without requiring funneling at each unit level. File only that needed material which will facilitate search by using a smaller number of expensive cabinets and saving thousands of man-hours. If it isn't required, burn it. Eliminate letters involving transmittal, receipt acknowledged, reports of corrective action, and the like. Maintain only needed publications. Over ten thousand persons are posting complete sets of Army Regulations when only a few directives are really needed. If a report cannot be eliminated, reduce the number of copies and the number of line items, and eliminate duplication of other reports. Retire only essential documents. Not only are we saving non-essential trash, but we are needlessly duplicating the retirement of letters and publications at every command level.

Unfortunately, those responsible for Army administration have failed to keep pace with streamlined improvements in other services. For the most part, we are employing the laborious methods of seventy-five years ago. We have not taken complete advantage of office machinery and other systems to facilitate processing of paper. Progress is mostly imaginary, for in reality

This department is designed to accommodate the short, pithy and good humored expression of ideas—radical and reactionary, new and old. We pay for all contributions published but you deserve to be put on notice that the rate of payment depends upon the originality of the subject and the quality of writing rather than length. This department is hungry for contributions, so shoot that good idea in . . . today.

we still can't see the forest for the trees. Of course, less resistance is encountered to administrative changes and improvements when we merely skirt the problem. Demonstrations of machine speeds and capabilities are not the complete answer by any means. We must eliminate the *generation* of paperwork, and streamline those actions which *are* essential. Too much effort has been spent on mechanizing those administrative actions which create an unnecessary burden.

Many commanders have asked whether paper-cutting drives have been successful. The answer is a resounding yes. For example, two paper-chase drives in USAREUR eliminated 1,898 local forms and 7,054 local reports; 596 reports and 217 forms or certificates were recommended to Department of the Army or higher headquarters for elimination; 37,973 linear feet of unnecessary records and convenience files were destroyed; 12,150 linear feet of publications were saved by distributing only on a need-to-know basis; 4,305 four-drawer filing cabinets were turned back to supply channels; 50,757 reams of paper were saved annually by revising distribution of local publications.

Paper-chase drives initiated by Department of the Army have been devoted primarily to restricting distribution of publications to a strictly need-to-know basis, thus saving hundreds of tons of paper and thousands of man-hours. However, much remains to be done at DA level to eliminate those non-essential administrative actions which burden down our fighting units. Only continuous vigilance will reduce paperwork and eliminate unnecessary actions so as to keep our Army combat-ready.

Colonel H. E. Alphin, *Secretary of the RA Officer Augmentation Board, TAGO, was commissioned in the Infantry from VPI in 1934 and transferred to AGC in 1942 with primary assignments in personnel accounting and administration.*

LET'S HAVE MORE COMPETITION

SGT. BEN MOSKOWITZ

I AM the leader-instructor of a teenage rifle club (affiliated with the National Rifle Association), composed of youngsters who are a typical cross-section of American kids; their experience with firearms varies from almost continuous association throughout their growing years, to no association at all prior to joining the group. They are afflicted with a similar cross-section of handicaps: some are gun-shy; others wear glasses (my best shooter is as blind as a bat without his); still others come apart in the heat of intense application.

All this notwithstanding, most of these boys can outshoot me or, for that matter, you. This is not to pat myself on the back for making expert marksmen out of clay, because the only thing I—or any other instructor—showed them was the proper way to hold, aim, and squeeze. The refinement and the incentive were and could have been provided only by themselves.

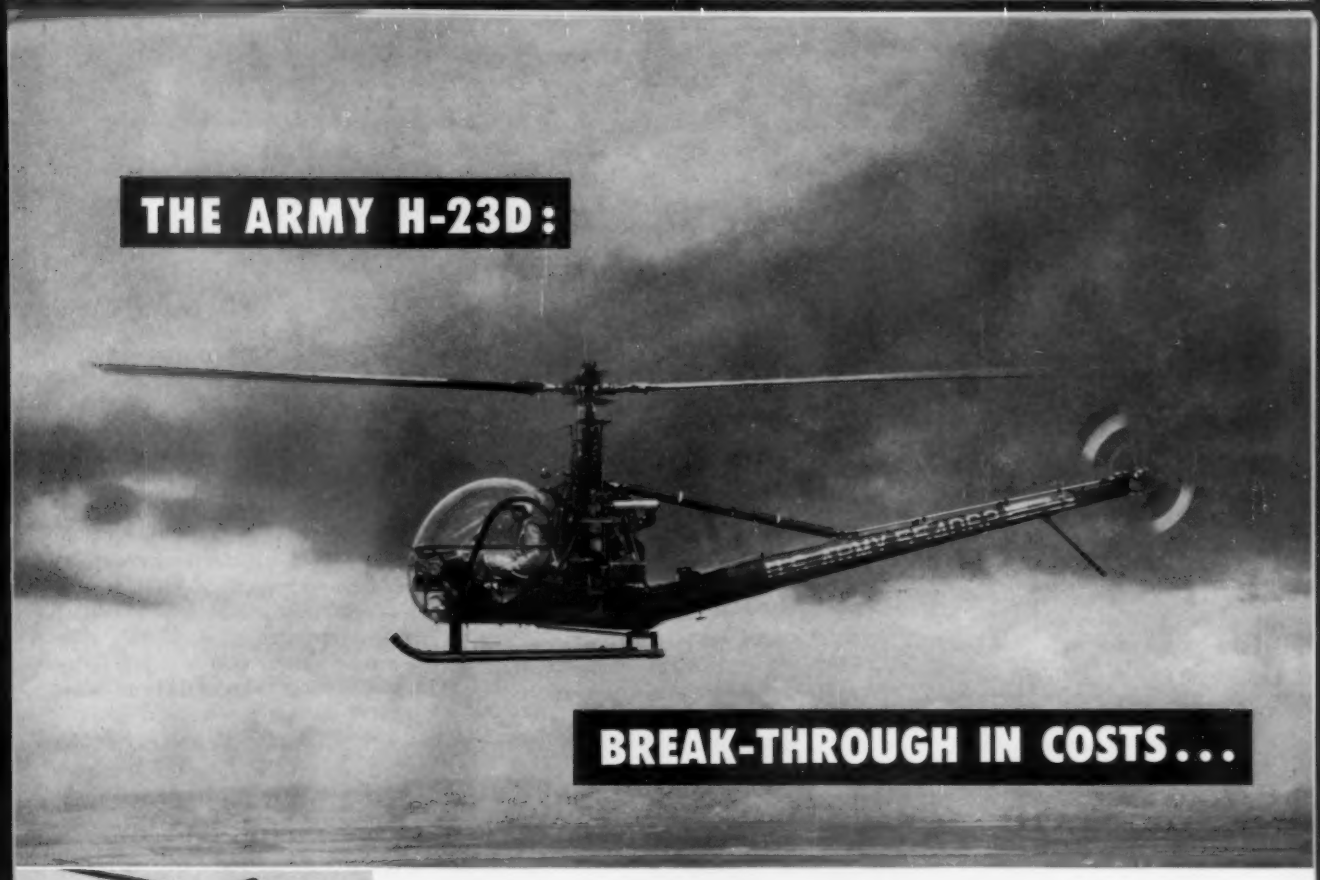
The refinement was practice, at the local Army Reserve range. The incentive? The incentive was competition. They are in competition with themselves, with me, with other groups. They have learned to shoot for the clean sport of it, for the sheer excitement of aiming a wavering ten-pound rifle at a stationary target, and then squeezing round after round into the bull's eye. They have learned the mastery of mind and body over a precision machine, over a machine that can be precisely wrong as it can be precisely right, depending on who is in control.

All of this brings us to the problems of teaching people to shoot, and to shoot effectively, where it may have to count. CONARC has come along with Trainfire, and its various adjuncts and offshoots, designed to teach the soldier how to shoot more effectively. But we have not yet come up with something that will make him *want* to shoot more effectively.

The known-distance range system, with its accompanying M1 pencil, at its best provided some excellent marksmen, at its worst merely taught some men which end of the rifle to point. A competitive spirit, which might have easily been developed on a KD range, was lost in a morass of range detail, multiple-order firing, and the usual attendant problems, such as weather, the march out to the range, and the like. It seemed to me that all we ever did out there was satisfy the requirement of the ATP for initial and thereafter annual qualification firing. No attempt was ever made, or could hardly have ever been made, to make a sport out of the thing, pitting one company or platoon against another, to make the soldier want to have some pride in how well he could handle his rifle. And so we ticked off the interminable hours, aimed more or less carefully at our targets, wrote up some fancy scores, and waited with patience for the last order to squeeze off the last round. And the nicest part of the day was the march back to the cantonment area.

Certainly, Trainfire will teach soldiers that shooting to kill is more than shooting at a bull's eye; but the individual determination for proper, careful, systematic shooting is lost even there, for the good soldier shoots honestly because he recognizes honest values; the poor soldier shoots at the target to get it over and done with and the hell out of there. Neither shoots because of any personal pride instilled in him in the use of a sporting device, or in the hope of a tangible or intangible recognition of his skill other than the impersonal award of the shooter's medal. Even the winning and the award of this medal could be put on a more competitive level, but the competition doesn't start with the award; it ends with the award.

Some time prior to range firing, some effort ought to be made to align this necessary part of our training with a competitive sport concept. It will involve a revision of the methods of preliminary rifle instruction together with a concerted movement to make a real competition out of it, ranging one man against another, one squad against another, one company against another. If we can teach our basics that aside from its obvious intended use, the rifle is an excellent sporting device and that rifle shooting is a clean, legitimate sport that brings out the best powers of concentration and judgment in a man, we have gotten halfway across. If we can then develop an *esprit de corps* that will make our men want to excel in what they do, as a group—a *team*—we have gotten a little farther.



1000 HOUR TEST COMPLETED — Hiller crew standing beside Army H-23D after completion of 1000 hour accelerated ground endurance test

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And if we can apply these principles to the handling of a rifle in a simulated combat experience, such as Trainfire, we are all the way there. All we then have to do is add up the scores.

Let us not forget that all our training, all our discipline, all our rules are developed in the furtherance of competition of the greatest sort—that between nations. If we would be first in the larger competitions, it would be well for us to develop the small ones.

***Sergeant Ben Moskowitz** entered the Army in 1951, served with the TC in Greenland, the Military Mission to Thailand, and with the 3d Division at Fort Benning. He is on duty with the USAR Training Center, Norfolk, Va.*

BAYONET TRAINING—M1905?

CAPT. HARLAN G. KOCH

"HAWN GUARRD! Come on, men, sound off! Let's hear and see some *fight* in this outfit!"

How many times have we heard or used this inspiring statement to "fire up" a half-hearted, naturally unrealistic bayonet class? How many times have you watched men stumble through the drill as they tried to remember which foot to put where? How many times have you wondered why we persist in teaching men the off-balance, grotesque and unnatural positions of the present bayonet drill? Do you really think you'd use those positions if you were faced with a real enemy? I don't think so, nor do you. However, the Army continues to use essentially the same system of bayonet drill that harassed second lieutenants were forced to teach in 1905. We continue replacing the sawdust bowels of bayonet dummies that can't fight back, and, no doubt there are some who think we're instilling fighting spirit and confidence in our soldiers. We're not—so let's stop kidding ourselves.

Let's pit one soldier against the other and let the men get a taste of live competition. That's the test! Facing a fierce burlap bag is no trial nor will it develop latent or hidden fighting spirit. Let's also cash in those dancing class FM 23-25 steps for something more natural and physically compatible. There are few young men who haven't squared off at least once to settle a sandlot difference. Throwing a right or a left is a natural sort of thing; bayonet can be taught in the same way as boxing. Then, when the cold steel actually comes their way the men will meet the test confidently and skillfully.

At the University of Illinois in 1953, I met Dr. Seidler of the Physical Education Department. As a physical education expert during World War II, his job had consisted of travelling from post to post inspecting or establishing physical training and bayonet training programs. It was then he discovered that our "off-balance" bayonet positions were unnatural, particularly for an athlete. In 1953 he completed a University research project which developed a new bayonet technique. During the project, he, as a very capable bayonet instructor, trained a group of college physical education students, all athletes, in the Army's bayonet technique. He also trained a similar group in the Seidler bayonet technique. Each group was trained the same number of hours in the respective systems. Each man was armed with a 9½-pound pugil stick, a wooden stock, well padded on both ends. In competition, the Seidler method team shellacked the Army method team, 21 to 1. As this was a scientific study, the amounts of oxygen gulped in by each combatant were measured and energy depletion was calculated. Men using the Army system burned up considerably more energy and wheezed in larger amounts of air while their less depleted and more relaxed Seidler opponents trounced them.

I will not describe in detail each of the Seidler positions, but they are: the horizontal butt stroke, almost exactly like a boxer's right hook; the vertical butt stroke—a rugged right uppercut movement; the jab may be likened to the long, left jab; and finally the horizontal slash which compares closely with the left hook.

These five offensive movements stem from one of the oldest sports known to man. You don't have to think where your right or left foot goes; it's natural. Every kid in the US has been unconsciously practicing these movements during his horseplay, boxing or sparring.

Bayonet training using the Seidler system would be revolutionary compared to the present Army system and would engender a great deal of real competitive spirit. There would be no difficulty in knowing who is the best bayonet fighter in the squad, tank crew or gun section. A dispute could easily be settled by a challenge. Competitions could extend to platoon and company or battery. Regimental and combat command bayonet championships could be set up. It could be further developed into a real interpost, contact sport competition. It would be a prize worth wearing to sport an expert badge in bayonet and to know that you didn't get it by charging into dummies.

A real whack with the end of the pugil stick would take the horseplay out of the bayonet period and would add measurable seriousness to the class. Dr. Seidler stated that members of his two teams saw stars on occasion but never experienced more than a minor physical injury.

Company or battalion training aids could stock at least 150 pugil sticks. They should be well built and balanced much like a rifle. Where does the money come from? Tour around any Army post which trains combat troops and inspection will reveal elaborate bayonet courses. There are fearless sawdust effigies awaiting the growling soldiers. Some have heads to be knocked over and some have 2-by-2-inch wooden sticks, representing rifles, which are very easily parried. Their springs and weights offer little fighting resistance and most inspections will reveal their soft innards dusted over the ground. Ordnance replaces broken stocks and civilian post engineer repair crews trek to these grounds weekly to fill and sew back the fight in these dummies. Our soldiers continue to charge in fiercely. To sell our historic system we set up even more elaborate and expensive bayonet assault courses where the men scale walls, leap ditches, thread through barbed wire, and occasionally spike a dummy so that we know "it's for bayonet" and not just another obstacle course. Eliminate these and there will be money left over for the purchase of many pugil sticks.

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The sad history of the Seidler system is that it was submitted to the Army by Dr. Seidler in early 1953. The Army reportedly reviewed it and reproduced three copies of the Seidler report that now die dusty deaths in Georgia. Dr. Seidler thereafter submitted it to the Marines who adopted it in late 1954. Instead of 21-to-1 wins for the Seidler system over the old system, the Marines at Parris Island have tested and smoothed it out to a 54-to-1 ratio.

There should be no substitute for realistic training, particularly when it is so readily available. Futuristic superweapon thinking is great, but let's not lose sight of the man with the bayonet!

Captain Harlan G. Koch, Armor, *a 1946 graduate of the Military Academy, earned a graduate degree in geography at the University of Illinois and has served in Korea, Japan and Thailand. He is now with the 4th Armored Division at Fort Hood, Texas, and has contributed several articles to past issues.*

YOU ARE THE ARMY

CAPT. EUGENE JONES

THE Army has been ridiculed and derided for so long by such a large number of its members that to many civilians it no longer represents a tangible, interdependent organization dedicated to a common mission. To too many it is merely an impersonal detached entity—a necessary evil to be tolerated—and becomes the object of amateurish analysis of its ills by any and all grades of intelligence. For too long we in the service have adhered to the time-worn old saw that bitching indicates a healthy morale in soldiers. That may have been true years ago when emotional outlets were limited, but in our era of social progress and psychological growth we should no longer clothe the Army in sackcloth and ashes.

If you think I'm alone in my opinion, listen to what General Taylor said not too long ago: "To those of us who have spent our adult lives in the Army, it has a personality widely at variance with that usually depicted to the public in the press and on the screen. It troubles me to find our service often treated as hidebound, backward-looking, and outmoded instead of 'tried, trusty, reliable, and ready'."

Why must this be so? I think it is because the natural reaction to frustration is antagonism which seeks a scapegoat. The Army provides the frustrated soldier with something to kick. Even one removed from the pain of the boot through completion of military obligation develops a facility for using it. His pre-service development failed to prepare him for the transition to military life. Some eventually adjust. Others never do; they spend a good portion of their military life abusing any and all things military. My life has been ruined. I'd be a colonel had I played politics. My men are stupid, my sergeants incompetent, my officers lazy. My quarters belong in a slum, the food is like garbage, the pay inadequate. And so on and on. Weighed against the contribution he has made, the damage he has done is multiplied by the number of men he has disillusioned, embittered and brainwashed to his line of thinking because of personal frustration. What the Army needs and invites is intelligent, well-intentioned constructive criticism looking to military progress rather than to personal gain.

It's time we stopped and reevaluated the need for the chronic bitcher. It's time we paused a moment for a personal evaluation of the Army—its mission, its organization, and the means by which and with which it does its job. When we do this we realize that our Army is not the whim of a nitwit but a complex, highly developed, widely diversified organization guided by competent, devoted and spirited leaders. It exists only to preserve what so many of us consider the ultimate worldly value—human life in a free society.

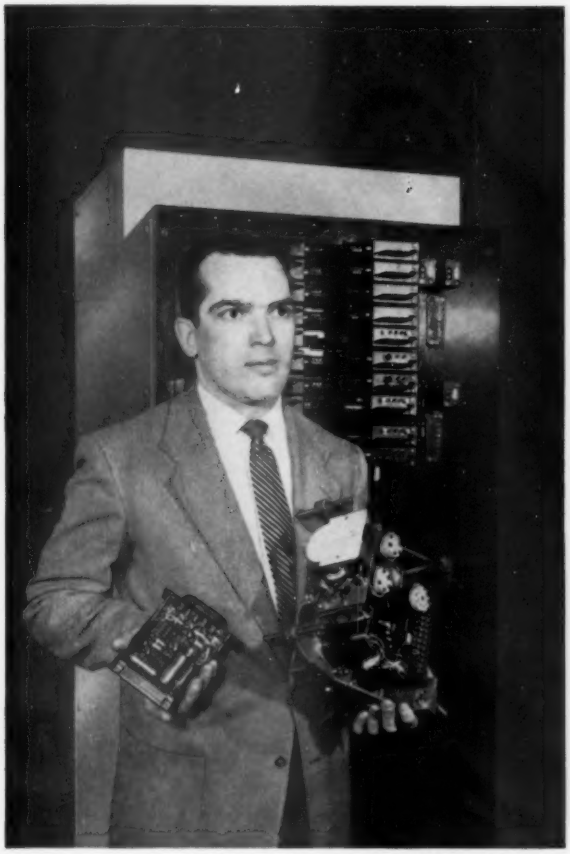
We, products of the American way of life, are its Army. We make and share its successes, its failure, its strength, its weaknesses, its aspirations and its salvation. The criticism we so freely and frequently level on it as a body more often should be directed toward ourselves. We criticize its red tape when we don't even bother to consult the pertinent AR which outlines what we should have done but didn't. We damn supply procedures for their bulk and bother while we spend half a day scrounging something that could have been requisitioned in a couple of minutes. We complain of after-duty work when we spend less than two-thirds of a work-day actively and constructively. Each of us could recount endless examples. They indicate that a vast number of our gripes against the Army are self-created, self-nurtured and self-perpetuated to the extent that we become incapable of discerning the true source or cause of our complaint.

There is reason for wondering if our willingness and readiness to criticize the Army does not entail deeper moral and psychological implications than we care to acknowledge; whether we possess the necessary military qualifications, personal honor and integrity and impersonal judgment that go into constructive criticism. We must realize that criticism also encompasses "self," and must not be motivated by antagonism that blinds our serious thinking or well-meaning intentions. To paraphrase Matthew, we must first cast the beam from our own eye before we attempt to remove the mote from the Army's.

You can't cure the Army's ills by rule or regulation. More panaceas have been prescribed for the Army than are written yearly for the preservation of the national health.

As much good can accrue to the Army from our personal efforts as may be expected from some "authority given" directive. When we can satisfy ourselves that we are performing to the best of our ability, maintaining our professional competence, subordinating our illogical personal desires and whims, guiding ourselves with honor, truth and integrity—in short, when we conduct ourselves as moral, purposeful men—then we are taking a giant step toward building a better Army. For is not building a better Army building better men?

Captain Eugene Jones, Signal Corps, *was an enlisted laboratory technician before graduating from OCS in 1949. After several assignments in the Far East he served with the 9th Infantry Division at Fort Carson, and is now stationed at Fort Monmouth, N. J.*



Robert Rossler, FICo engineer, holding plug-in analog modules — a transistorized amplifier unit and an electro-mechanical unit. Electronic panel of analog computer is in background.

FICo digital engineer Peter Carbone holding digital module, comprised of easily removable transistorized printed circuits. Rack-type digital computer is in background.

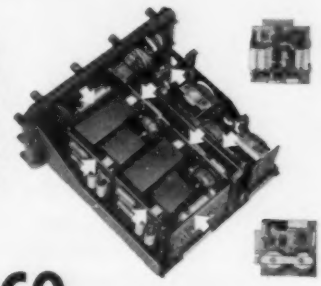
ANALOG or DIGITAL:

WHICH TYPE OF SPECIAL-PURPOSE COMPUTER IS BETTER?

THE ANSWER: ***It depends on the application.***

Ford Instrument develops and produces *both* types of computers — analog and digital — for an unlimited range of systems applications. FICo analyzes the problem and designs the computer best suited to the needs of the application, in terms of reliability, flexibility, economy, and size. For both types of special-purpose computers FICo employs modular techniques, simplifying the problems of design and manufacturing . . . and making servicing fast, simple, and economical.

FICo has developed and produced special-purpose computers to handle an extreme variety of problems — including missile and rocket launching, missile guidance, airborne and tank navigation, test and other data processing, degaussing, torpedo launching, gunfire control, and many others.



FICo modular techniques as applied to an amplifier for an airborne navigational system. Arrows point to printed circuit amplifiers. Two typical cards are shown at right.

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FRONT AND CENTER

(Continued from page 16)

Academy, with Army, Navy and Air Force branches, can move to Heidelberg, where the facilities of a major university and the main atomic research center at nearby Karlsruhe will be available to students.

While graduates of the Command Academy will form the nucleus of a General Staff, a general staff corps as a permanent élite group in the West German armed forces has not been revived. All officers are required to have rounded experience, so that the personnel of the General Staff will be constantly changing.

British Army Air Corps

An interesting sidelight on the role limits of Army Aviation is provided by the British Army's announcement that it will take over responsibility for its own light aircraft and helicopters and in September will formally organize its own Army Air Corps. The new Corps will be assigned duties including reconnaissance, communications, casualty collection, transportation of light stores and traffic control in operational conditions. The basic unit of the Corps will be the flight, one of which will be normally a part of an Army brigade group.

1957 REUNIONS

27th Infantry Division. Sept. Write Lawrence Reagan, PO Box 1403, Albany, 1, N. Y.

34th Infantry Division. 27-29 Sept. Nicollet Hotel, Minneapolis. Write Junior F. Miller, Red Horse Armory, Des Moines, Iowa.

45th Infantry Division. 13-15 Sept. Hotel Lawtonian, Lawton, Okla. Write Lt. Col. J. N. Adler, 2205 N. Central, Oklahoma City, Okla.

77th Infantry Division. Nov. Write J. Woolwich, 28 E. 29th St., New York 16, N. Y.

90th Infantry Division. 13-15 Sept. Hotel Leamington, Minneapolis, Minn. Write Howard A. Stotler, Box 1151, Beverly Hills, Calif.

96th Infantry Division. Write Minor Butler, Box 144, Mount Erie, Ill.

100th Infantry Division. 6-8 Sept. Hotel Statler, Hartford, Conn. Write Thomas C. Burdett, 114 S. Main St., Taylor, Pa.

Signal Corps ADPS Course

The Army Signal School at Fort Monmouth, N. J., is opening a new four-and-a-half-week course in the basic applications of Automatic Data Processing System (ADPS). The course, to be attended by field-grade officers and key civilians from the Department of the Army, will be divided into six classes of 25 students each. Equipment used and studied will include, among others, Remington Rand's Univac, Burroughs' Datatron, RCA's Bizmac, the Monroe Monrobot, IBM machines, and National Cash Register equipment.

ADPS makes possible the processing of large amounts of technical data at electronic speed, the storing of voluminous information for trigger-quick use, almost instantaneous computations on target acquisitions, providing maximum effectiveness and troop safety, and greatly increased aid in the logistics area.

New Yorkers are not easily impressed but the big town went for the Army's Redstone when it appeared in Grand Central Terminal as a salute to the International Geophysical Year. Sponsors of the exhibition report that the 62-foot missile stopped thousands of travellers and received far more than the usual amount of newspaper and radio-TV comment.

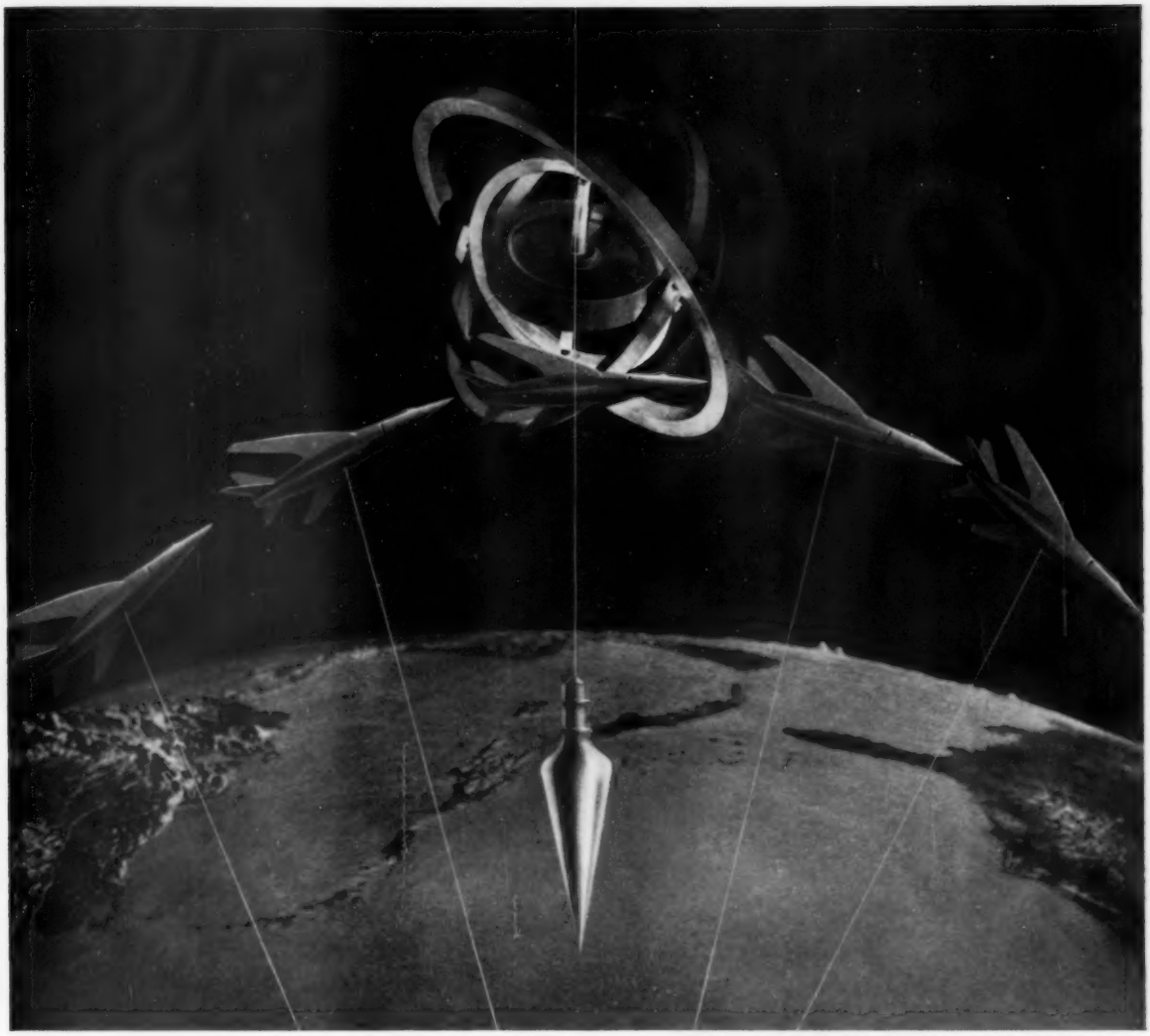
Ford Instrument Co.

General Officer Shifts

Gen. Lyman L. Lemnitzer to Vice Chief of Staff . . . **Lt. Gen. William S. Lawton** to Army Comptroller . . . **Maj. Gen. Verdi B. Barnes** to Joint Middle East Planning Committee . . . **Maj. Gen. Edwin H. J. Carns** to USARPAC . . . **Maj. Gen. Robert W. Colglazier** to ODCSLOG . . . **Maj. Gen. Carl H. Jark** to OSD . . . **Maj. Gen. Martin J. Morin** to XX Corps (Reserve) . . . **Maj. Gen. Edward J. O'Neill** to USAREUR . . . **Maj. Gen. Albert Pierson** to OTIG . . . **Maj. Gen. Sam C. Russell** to Commandant, Air Defense School . . . **Maj. Gen. Herbert J. Vander Heide** to XXI Corps (Reserve) . . . **Brig. Gen. William A. Carter, Jr.,** to president, Mississippi River Commission . . . **Brig. Gen. Chester B. DeGavre** to 82d Airborne Division . . . **Brig. Gen. John C. Hayden** to USA Artillery & Missile Center . . . **Brig. Gen. Briard P. Johnson** to USA Military District, Minnesota . . . **Brig. Gen. Thomas A. Lane** to USATC, Engineers . . . **Brig. Gen. Frank C. McConnell** to Sixth U. S. Army . . . **Brig. Gen. Francis J. McMorrow** to OCORD . . . **Brig. Gen. Archibald W. Stuart** to USARPAC . . . **Brig. Gen. Marshall Stubbs** to 1st Logistical Command . . . **Brig. Gen. Legare K. Tarrant** to 1st Region, USARADCOM . . . **Brig. Gen. Alvin G. Viney** to OCENG . . . **Brig. Gen. Frederick T. Voorhees** to USARJ/UNC/EA(R) . . . **Brig. Gen. George W. White** to USA Ordnance Training Command.

Retirements

Lt. Gen. Thomas W. Herren . . . **Maj. Gen. Edmund B. Sebree** . . . **Maj. Gen. C. Rodney Smith** . . . **Brig. Gen. Paul D. Berrigan** . . . **Brig. Gen. Charles P. Bixel** . . . **Brig. Gen. Jeremiah P. Holland** . . . **Brig. Gen. Gerald F. Lillard** . . . **Brig. Gen. William P. Pence** . . . **Brig. Gen. James V. Thompson** . . . **Brig. Gen. Russell W. Volckmann.**



Inertial navigation: *the new art of guiding aircraft to a pinpoint . . . without stars, radar, or human help*

Aircraft will soon be flying so fast, so far, so high that present systems of navigation will be hopelessly obsolete. The need has long been urgent for a new method that doesn't depend on star-fixes or earth signals.

Ten years ago the AUTONETICS Division of North American Aviation began an all-out effort on the development of inertial navigation. For the great advantage of this method is that it is entirely self-contained, depending on nothing outside its own precise components . . . retaining its accuracy regardless of weather, magnetic storms, or jamming.

An inertial navigation system continuously determines an aircraft's position. Because it knows where it started from and how fast it is going, it always knows where it is. Everything is done automatically by an ingenious crew of accelerometers, gyroscopes, computers, servomechanisms.

Early pioneering and consistent follow-through by AUTONETICS has resulted in the greatest total accomplishment yet made in this new science. From the beginning, AUTONETICS has emphasized optimum reliability under actual field conditions.

Today AUTONETICS is producing in quantity the electro-mechanical systems it designs: inertial navigation systems, flight controls, armament controls, computers, and other complete automatic control systems for the military and industry.

Autonetics

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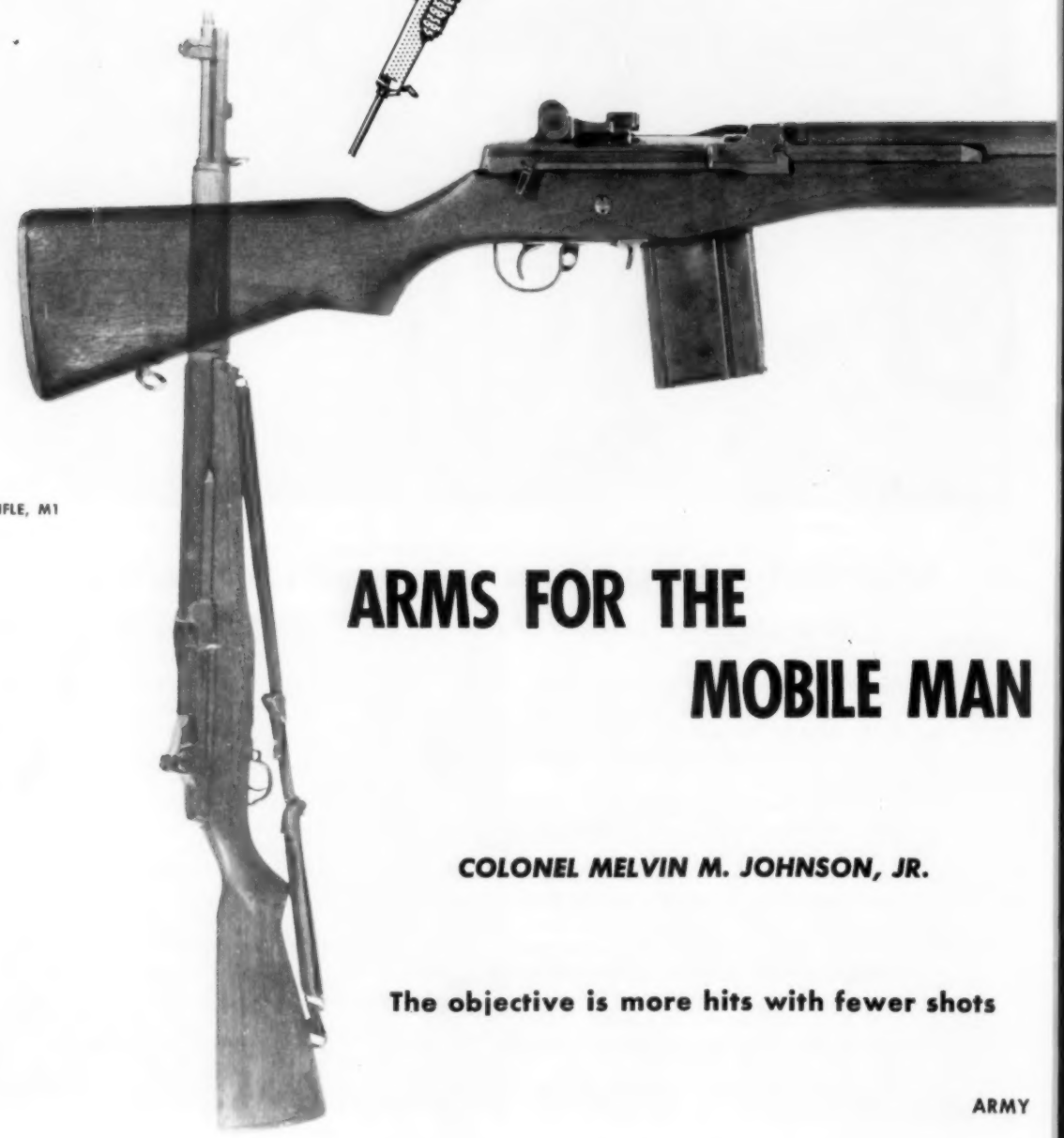
AUTOMATIC CONTROLS MAN HAS NEVER BUILT BEFORE

FAIRCHILD AR-10 RIFLE

BRITISH .280 SUBMACHINE GUN



U.S. RIFLE, M1

ARMS FOR THE MOBILE MAN

COLONEL MELVIN M. JOHNSON, JR.

The objective is more hits with fewer shots

SINCE in the past twenty years it has been my privilege to provide special weapons for the Army's First Special Service Force, Marine Corps raider units, and other military forces, I am prompted to submit some independent personal opinions as to present and future arms for the mobile man. I feel safe in assuming that hand guns and rifles will continue to be a necessary part of the arsenal of the soldier, and my comments will therefore have some pertinency. Wars can be averted by a few ounces of preventive lead.

It is my view that small arms of the future will fall into two families of weapons. One family will consist of the personal armament carried by those who man crew-served weapons and by combat leaders. The other family will be the general-purpose weapon of the combat rifleman and his ilk.

Colonel Melvin M. Johnson, Jr., USAR-Inactive, has contributed several articles on small arms and ammunition to *ARMY* and its predecessors. He is the inventor of the Johnson small-arms weapons and has served as a consultant on small arms to a number of firms and research organizations.

OLD INFANTRY SMALL ARMS SYSTEM. *Rear row, left to right:* Browning Automatic Rifle M1918A2, submachine gun M3A1, carbine M2, and rifle M1. *Front row, left to right:* heavy machine gun M1917A1 with tripod M74, light machine gun M1919A4 with tripod M2, light machine gun M1919A6 with bipod

The pistol continues to be needed since it is, as has been said, "a court of last resort." I would settle for a pistol that would get positive man-hits up to ten or twelve yards pointed from near eye level, since average men under average stress are not effective pistoleers at ranges beyond fifteen or twenty yards. Not requiring one hand for the horse's reins, I suggest two hands for longer shots, up to say twenty-five or thirty yards.

The carbine and submachine gun are glorified pistols augmented by shoulder-stock support. Historically, the submachine gun came first. It has three fatal limitations. It fires full automatic, so that after the first shot the average man could as well have blanks in the magazine; it is as heavy as any rifle; it shoots pistol ammunition of very limited range.

The carbine is in much the same class, except that the M1-M2 weighs some 5.5 pounds against seven to ten for submachine guns. The carbine cartridge is more powerful than average pistol-submachine gun loads, but it is a very far cry from the caliber .30 rifle. However, if you take a low-power pistol caliber *shoulder* weapon on semiautomatic fire from a closed breech, your basic hit capability goes up and your effective combat range may reach sixty to a hundred yards.

Weapons of the mobile riflemen

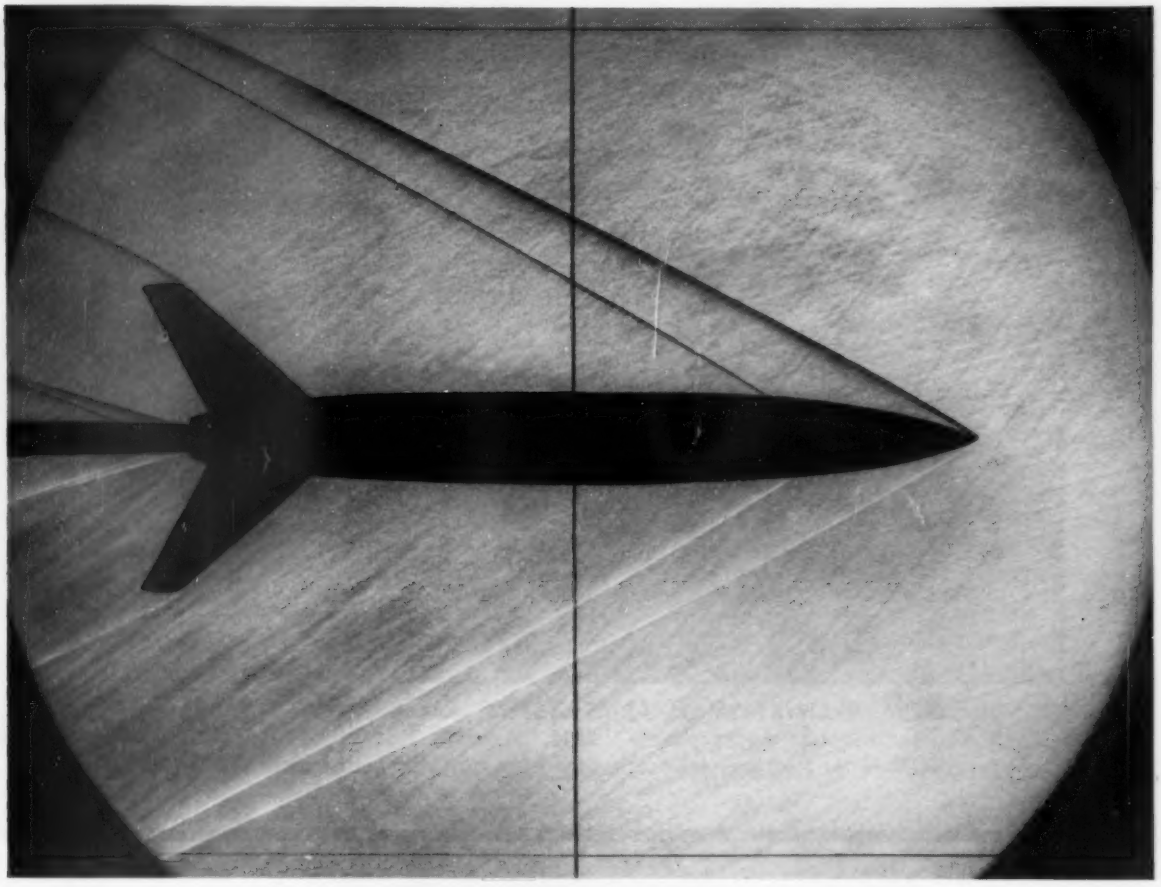
In my opinion, arms for the mobile man must include a personal family of pistol plus shoulder-fired subrifle, holster-harness carried. This weapons family is essential for every service. Such a weapon would combine pistol, carbine and submachine gun functions. It will be needed by missilemen as by men of other crew-serving units, engineers, instrument operators, and commissioned officers.

The basic pistol would fire a .224 to .244 bullet of some 35 to 55 grains at some 2,000 to 3,000 foot seconds. The shoulder pistol would have a longer barrel and folding shoulder support. Such semiautomatic type of arm would hold some fifteen rounds, clip-loaded. Pistol range in combat is up to 25 yards, shoulder-model 50 to 100 yards. Weight would be about three pounds with simplest tool-zeroed fixed sights, open for the pistol, large peep for the long-barrel version.

In considering the proper weapons for the rifleman of the future we should look first at what we now have, then what is being done and finally what might be done. To get the full picture we have to look at not only the M1 rifle and the automatic rifle, but at some of our present machine guns, since our objective is to combine the functions of these several weapons so far as possible.

The M1 rifle, and the new M14, have a major capability never fully appreciated. On quick semi-automatic you can effectively discharge eight shots in two or three seconds with the M1, up to twenty shots in five to seven seconds with the M14 and M15. This is fast. It amounts to controlled burst fire at 160 to 240 shots per minute rate, approaching BAR slow-rate automatic fire (350 rpm).

Some authorities say a third of the rifleman's fire is from prone. A light bipod support will at least double your hits and your rate of hits. Hip fire is dramatic, burst fire sounds menacing, but fast on-shoulder standing or crouching assault fire is much more deadly on semiautomatic. This is provided in both the new M14 rifle and M15 autorifle.



Schlieren photograph of supersonic flight patterns in wind tunnel.

There is a formula behind America's supersonic might

The fate of freedom cannot hinge on trial and error. Our future security depends on making major supersonic advances at a quickening tempo... on developing aircraft, manned and unmanned, to fly at far beyond today's speeds and altitudes.

North American Aviation's experience in the design and production of supersonic aircraft—by far the greatest in the Free World—is focused full upon this vital problem. The new aircraft and weapons systems now in progress will be as remarkable tomorrow as these achievements of today:

Supersonic capability of North American's brilliant F-100 Super Sabre series has given the Air Force its most dependable supersonic fighter. In 1953, the first production-line F-100 flew faster than the speed of sound on its first flight. In 1954—two years before any other supersonic airplane became operational—the Air Force had F-100s in wing strength. There's still no Air Force operational airplane that can match its tactical and combat versatility.

Supersonic history will be made by North American's X-15 experimental rocket-powered airplane. It will carry man faster and higher than he has ever flown before. It is setting the pace for the Air Force of tomorrow.

Other major supersonic projects at North American: a long-range interceptor for the Air Force at the Los Angeles Division, and the A3J, a carrier-based attack weapon system for the Navy, at the Columbus Division.

From the P-51 through the F-86 and the F-100, North American has designed planes with growth potential to use more power as it became available. It has translated this ideal performance into wing-strength reality—accurately, rapidly, and at lowest possible cost.

The formula for supersonic strength in the future is supersonic experience today. North American has it.

NORTH AMERICAN AVIATION, INC.

Los Angeles, Fresno, Canoga Park, Downey, California; Columbus, Ohio; Neosho, Missouri.

NORTH AMERICAN HAS BUILT MORE SUPERSONIC AIRCRAFT THAN ALL OTHER COMPANIES COMBINED

NEW INFANTRY SMALL ARMS SYSTEM. *Rear row, left to right:* automatic rifle (heavy barrel) M15, automatic rifle (light barrel) M14. *Front row:* general-purpose machine gun M60 with tripod M91

A basic rifle problem is correct zero of the sights for combat range. The best Olympic match rifle won't hit a barn if it is not accurately sight-adjusted for medium combat range.

A man can do much more with the standard rifle if

(1) His piece is zeroed;
(2) He uses fast semiautomatic fire plus basic slower fire;
(3) He uses support prone;
(4) He fires from the shoulder in assault;
(5) He uses a larger peep hole;
(6) He has learned in combat training what he can really do with his weapon.

Machine guns

The standard AR M1918A2 and the other Browning-invented belt-fed machine guns, M1917 water-cooled, M1919A4-A6 air-cooled, are somewhat beyond the one-man arms area. The soldier's weapon load is taken to be twenty-five pounds. The M1919A6 with bipod weighs 36 pounds, the AR 1918A2 with bipod over 20 pounds. The new M60 general-purpose machine gun approaches 23 pounds. The new M15 weighs twelve pounds.

Over the years since World War I there has been a tendency toward full-automatic burst fire. Objectively, there is no magic in burst fire. There is combat effect in a well-directed spray of slugs, three or more fired pop-pop-pop. The heavy machine gun necessarily depended on burst fire and was weight-stable enough to support it. But the price paid in weight and wasted ammunition far exceeds the cost of fast semiautomatic fire in combat terms of weapon weight, ammunition weight, rounds fired per hit, and time elapsed per hit.

I cannot yet comprehend why fast semiautomatic fire, as a modern replacement for ancient machine-gun automatic burst fire, has not yet caught on. The original M1918 automatic rifle with semiautomatic and full-automatic control plus A2 bipod remains my own "as now still issued" nomination.

So much for what the man might do with the arms he has.

As noted in previous issues of this magazine, there has been some effort directed toward producing light automatic rifles. I described the Fairchild AR-10 rifle in the February 1957 issue. Other references have been made to the experimental U. S. T44 and T44E1 rifles now adopted, the Belgian T48 FN, the British EM2, and the half-inch shortened caliber .30 (7.62mm NATO) cartridge.

The major trends aim toward reduced weapon and ammunition weight, and "families" of basically common weapons. Thus, the "light automatic rifle" is supposed to provide not only a basic shoulder weapon, but also an automatic rifle replacement with heavier barrel and bipod. Such a family concept was seen in my own M1941 Johnson semiautomatic rifle and M1941 light machine gun, and now in the M14-M15.

The light automatic was at one time considered to serve also as a replacement for the carbine, submachine gun, and pistol. While a 7-pound automatic rifle might replace an 8-pound submachine gun, it is not likely to take the place of a 5-pound carbine or 2.5-pound pistol.

From the standpoint of simplified training, maintenance, procurement and cost, the advantages of family weapons are quite obvious. There still

T-37

AT WORK

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Cessna

remains, however, an American tendency toward gun gadgetry. Crude as they may appear, Soviet weapons have the virtue of simplicity. The less gadgets, the fewer sources of malfunction, user confusion, maintenance muddles and cost.

In my opinion, any shoulder-supported weapon, unless it has at least a bipod, should never have full-automatic control gadgetry. Short of a belt-fed machine gun, I doubt the use of any full-automatic fire, especially in lightweight high-power weapons. Fast semiautomatic fire provides reasonable burst rates of 150 to 300 shots per minute, three to five shots per second, approaching the AR M1918A2's 350 per minute slow rate noted above.

Loading and reloading

A major problem in shoulder weapon fire effect is loading and part-empty replenishing. The M1 is *en bloc* clip-loaded from open breech, a system originated before 1900, and is not conveniently replenished when partly empty. Our various automatic pistols, submachine guns, and carbines have been detachable-box magazine-loaded. Rifles as ancient as the 1900 vintage British SMLE had both detachable box and strip-clip or charger, later seen in foreign semiautomatics such as the Tokarev and Gewehr 41-43, and sought in recent U. S. light-rifle programs.

Encouraged by discussions with U.S. Army Infantry Board and Marine Corps experts, and the editors of *Infantry Journal* (now *ARMY*), I was able to develop the 1938-41 Johnson rotary and horizontal feed systems which provided strip-clip and single-round side loading without opening the breech, plus detachable magazine in the machine-gun version. These features were perhaps advanced for their time. However, the ultimate goal is a feed system which once loaded shoots on and on.

Combat fire-fight time required to reload probably varies from five to ten seconds. The conventional clip and box magazine must be removed from a belt-pouch. The empty should be returned to an empty pouch (or lost). The fresh "clip" must be inserted, bolt catch pressed or cocking handle (AR) pulled. The M1 block clip is fast because no magazine detachment is required. However, gadgets are required to eject the empty. The partial-replenish feature is lacking, but complete unloading for refill is optionally push-buttoned. M1 clips are less convenient to refill manually than AR-type magazines M14-M15.

The primary ammunition and loading goals are:

(1) Built-in feed and maximum capacity;
(2) Part-empty refill;
(3) Reduced weight of rounds;
(4) Minimum bulk;
(5) Flat combat-range trajectory;
(6) Low recoil;
(7) High lethality and body-armor penetration.

Achievement of all seven aims will require compromise.

The fastest feed for fire fights is the feed you need not refill. A reasonable ultimate system would be a simple belt requiring no removal of the rounds for function. Such feed would be close-stacked, eliminating fickle feed springs through use of gun power actuation. Means for partial refill would be desirable though that solution may be less apparent. However, optional partial refill of a 20- to 40-round separated double column vertical magazine is quite possible, in my estimation.

Ammunition

Ammunition is essentially a functioning factor in any automatic firearm. The size and shape of the slug, its velocity and range are also subjects of recurring ballistic debate.

The U. S. Army has used the conventional caliber .30 load for over half a century. Volley fire from rifles at 1,000 to 2,000 yards was then considered a factor for combat firearms, despite introduction before 1900 of the self-actuated machine gun. The 1906 and current M2 bullets, 150-grain flat base, are certainly effective against personnel at 2,000 yards, the 1926 to 1940 .30 172-grain boattail bullet up to 4,000 yards. But the trouble is that you can rarely see rifle targets much beyond 500 to 600 yards, more often not beyond 300 yards.

In my opinion, there are two equally serious blunderings over bullets. One group insists no one can hit combat targets with shoulder arms at any range, the other pontificates over prone fire possibles, poking V-rings (12-inch) at nearly half a mile.

Walk on any street, gaze from any window. Imagine standing or semi-prone battle-person silhouettes. You are shooting. You are fatigued, nervous, combat-jittery. Face it: your practical range is usually restricted to 150 to 300 yards, using the most superior shoulder weapons. Even prone with bipod, 300 to 400 yards will be tough to tackle.

Increased ammunition range capability adds weight and recoil. Light bullets cannot compete with heavy bullets beyond 300 to 400 yards. Flatter trajectory means less error in combat-range elevation, but the higher velocity required also creates kick, chamber pressure, barrel erosion.

Other factors of importance are wind drift and Hague Conventions wound ballistics. You can holocaust-bomb Hiroshima, but full-metal bullet jackets are still required for refined rifles. Excessive wind drift ruins rifle zero. Light bullets retain lethality over probable combat ranges. Helmet and body-armor penetration remains reasonable with reduced recoil and consequent higher hit probability. Somewhere along the line there must be compromises.

Calibers and containers

In my opinion, the basic caliber .224 to .244 general-purpose rifle would marry the semiautomatic rifle, the auto-rifle, and the machine gun. The belted feed would have three options: basic 30-round container, 50- to 60-round assault machine gun detachable drum, and 100- to 200-round defense position box.

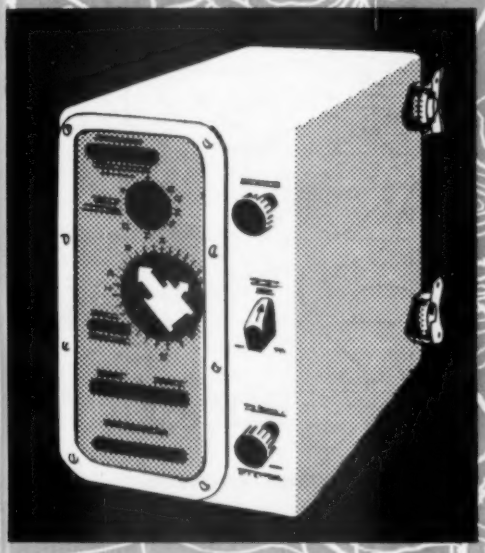
From all comparisons I have seen, ballistics similar to the new Winchester .243 (6mm) would be preferable, 80-grain bullet at 3,500 foot seconds. This load carries well in the wind and remains effective at any average maximum combat range.

This family would consist of the rifle, and the machine gun with heavier barrel, bipod, and a tripod if required. The rifle would weigh six to seven pounds, the machine gun with bipod nine to ten pounds, both including a combined compensator and flash reducer.

These weapons would have strictly combat sights with larger rear peephole, tool-adjusted for combat zero, with mid- and long-range movements. A range-finder telescope would be issued for the squad's sniper rifle.

I believe the two families of arms I have discussed are technically feasible and tactically practical for Futurarmy firearms.

CALL IT TERRAGATION



Farrell Bushing

This black box will give our Pentomic forces more mobility by telling Army drivers where they are and in which direction to go to get where they want to be

IN modern warfare, weapons, troops and supplies must be moved rapidly, regardless of the terrain or weather conditions. There is a likelihood that the combat area of tomorrow may be in meagerly mapped regions.

Great strides have been made by the Army in developing many types of vehicles for travelling over various terrain: snow, sand, marshes, and the like. But there is an additional problem which needed solution. This is summed up by the Corps of Engineers in its technical specifications—

"Vehicular navigation in unmapped areas has proven to be difficult because until now no satisfactory means has existed for locating position. Arctic, sub-Arctic and desert areas are examples of generally unmapped terrain where freedom of vehicular movement, lack of landmarks, and the existence of severe weather conditions all contribute to difficult navigation.

"Vehicular movements performed at night, even in mapped terrain, present navigational difficulties which parallel those experienced in unmapped terrain.

"Vehicular movement under best conditions can only be considered satisfactory when all vehicles know their absolute position with respect to an established base and their relative position with respect to other elements in their organization. Tactical control of a vehicular group requires the ability to move accurately in controlled patterns, rendezvous at selected points, and return to base with ease and certainty."

Working with the Engineer Research and Development Laboratories at Fort Belvoir, Virginia, Ford Instrument Company, a division of Sperry Rand Corporation, has come up with a design for a vehicle navigation computer which seems to meet the Army requirements. It enables a unit commander in a tank or other vehicle to know his exact location on the map, how to reach a designated position, and how to return to any given base.

This computer draws heavily from the design and the component development of air navigation equipment, developed and built by the Ford Instrument Company. A present position indicator and a dead-reckoning course and

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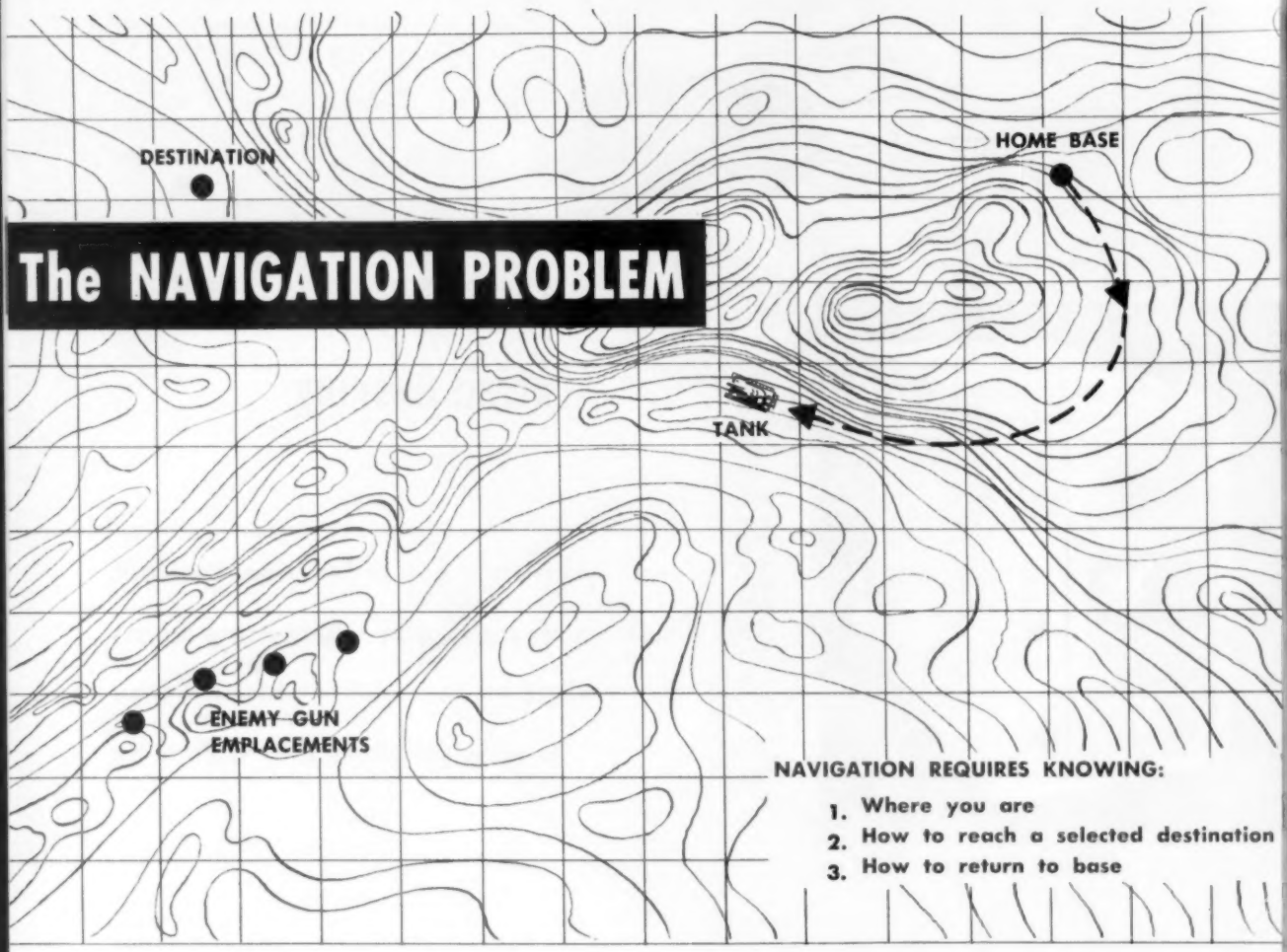
Farrell Bushing, Liaison Engineer with the Ford Instrument Co., Division of Sperry Rand, prepared this description of the terrain navigation computer at our request.



distance computer solved problems in aerial navigation which were similar to the specifications ERDL set out for terrain navigation, so the present instrument has a background of proved feasibility, reliability and accuracy.

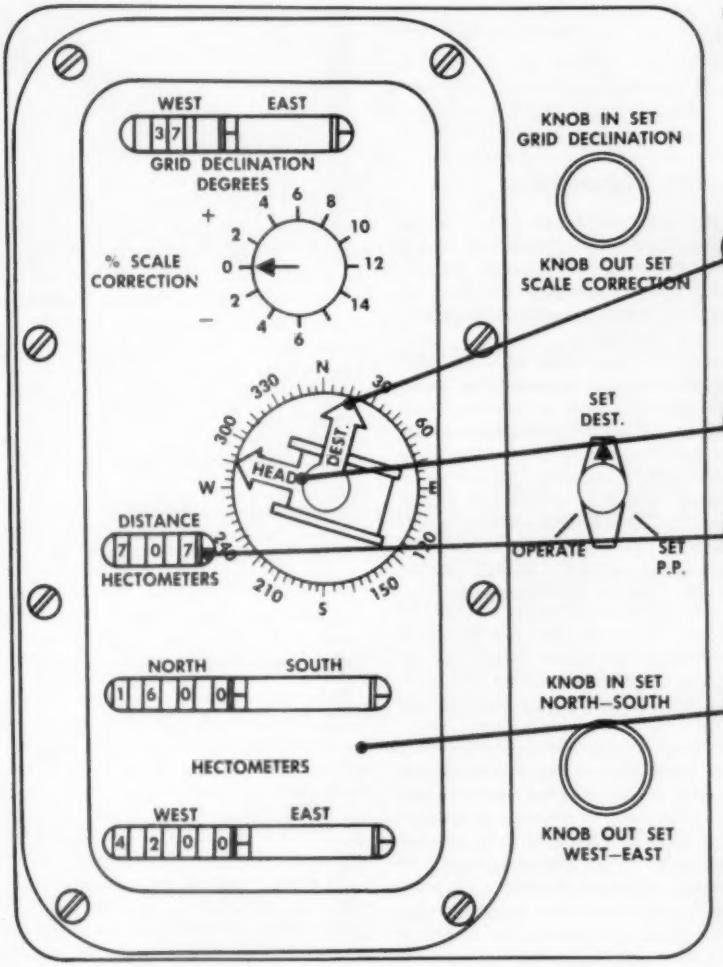
Crank in the Coordinates

Let us see how this little thirty-pound marvel works. Before leaving his rendezvous point or base, the commander flips the switch to SET-DEST. and then turns the knob at the lower right-hand corner until the map coordinates of his destination show on the instrument. Then he flips over to SET-P.P. and cranks in the coordinates of his present position—whether they be an advanced base, a known enemy position or a critical terrain feature he wishes to reach. If the terrain to be covered is such that the tracks on his vehicle have an appreciable slippage, the known factor for slip correction is set in. Automatic correction for the known grid declination can be taken care of by setting the counter at the top. Then the switch is thrown to OPERATE and everything is ready. The "navigator" is connected to the gyro compass the Corps of Engineers has developed for vehicles, and to the speedometer or odometer cable of the vehicle and thus gets the direction the vehicle is headed and the distance it is travelling. By means of components such as integrators, resolvers, electronic addition and subtraction circuitry, and others, the rectangular coordinates of the grid are translated into polar coordinates to indicate the course the vehicle is travelling and to compute the distance between it and the destination.

The tank commander has before him an arrow pointing in the compass direction he is heading and another arrow pointing in the direction of his chosen destination.

If he keeps both arrows together, he is headed for his destination by the shortest possible route. If some terrain feature forces him to detour, he merely swings around it and then gets back on course later by matching up his ar-

The SOLUTION



The *Automatic Navigation Computer* automatically and continuously determines and indicates:

- Steering information in the form of bearing from present position to a selected destination or base
- Present true heading of the vehicle
- Range information in the form of distance from present position to the selected destination
- Present map coordinates

. . . with corrections for

- . grid declination
- . . tread wear and slippage (% scale correction)

This schematic of the front of the computer was made from an early mock-up; production models have been somewhat altered

rows again. The computer has worked out his new course as he moved along his detour.

Also, he has a constant reading of the distance to his destination, computed in a straight line from wherever he is. Whether he has poor visibility due to weather or darkness, or because he has chosen to move through an area giving him concealment (and restricting his forward observation) he has continuous and automatic reading of distance and direction to his destination and his present position in grid coordinates is constantly before him.

Hq will know where you are

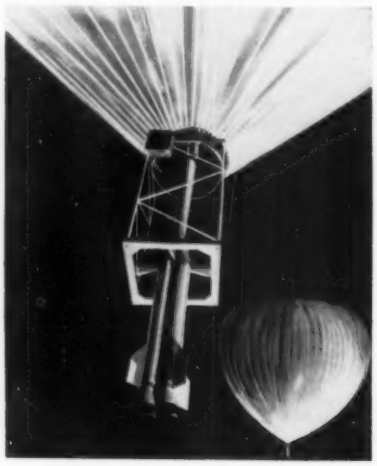
Thus he can inform his headquarters where he is at any time. He can take advantage of the terrain for concealment, for ease of movement, or for maximum maneuverability without ever losing track of his whereabouts or the distance and direction of his destination. This computer offers several other advantages. Should the vehicle pass a known landmark, any accumulated errors due to slippage of the vehicle track or extremely hilly terrain, or odometer errors, can be taken out by resetting the present position. Should word come to change his destination, a mere turn of the destination switch and knob will set the computer to answering this new "problem." And if a return to base is desired, he merely sets the coordinates of the base as a destination and his course and distance "home" is presented to him.

This Corps of Engineers terrain navigation computer (should we call it a "terragation" rather than "navigation" instrument?) will give Army mobility another great advance. No longer will tank commanders have to grope their way over wild terrain. Desert wastes or arctic bleakness will not be "trackless" to convoys of Army vehicles. Tundras, steppes, and forests can be penetrated by armor, weapons and supply vehicles with the confidence that they know where they are going, how to get there and how to return.

Irons in the Fire

Project Farside

Five Army Recruit rocket engines made by the Thiokol Chemical Corporation will form the first two stages of a rocket to be used in an attempt to free rockets from the high friction of the lower atmosphere and preserve their power for outer space. Air Force Project Farside, scheduled for late September, will use a huge, 200-feet-in-diameter balloon, the largest ever launched, to carry the four-stage rocket to an altitude of 100,000 feet before firing. Four Recruit engines will be in the first stage for the critical take-off and one will constitute the second stage. It is expected that the rocket will attain an ultimate altitude of several thousand miles.



Giant Project Farside balloon

Drone Contracts

The Army Signal Corps has awarded contracts for research and development work on drone aircraft to the Fairchild Aircraft Corp. and the Aircraft Division of the Rheem Manufacturing Company.

The Fairchild contract for $12 million is for high-speed drones.

The Rheem Co. contract of slightly more than $1.5 million is for the design and production of a new combat surveillance drone. The drone design, one of the first created specifically for this mission, will aim for low initial cost and inexpensive maintenance and will achieve reliability through the use of already developed and proven components. It will incorporate features permitting ease of operation and maintenance under combat conditions by relatively inexperienced personnel.

Powerful Lightweight

A new lightweight gas turbine engine, weighing approximately one-tenth as much as diesel or gas engines of comparable performance, is now under development by the Corps of Engineers' Research and Development Laboratories at Fort Belvoir.

Produced in conjunction with the AiResearch Manufacturing Company, the engine weighs only 326 pounds, is forty-four inches long, thirty-one inches wide, and twenty-nine inches high. Designed to meet the Army's requirement for a prime mover in a lightweight high-speed, 400-cycle, 100-kilowatt engine-generator set, the new turbine will be capable of producing 286 horsepower at sixty degrees Fahrenheit and sea level conditions and 170 horsepower under extreme environmental conditions.

Long Distance Dozer

The Army Engineer Research and Development Laboratories at Fort Belvoir are testing a robot tractor that can be operated anywhere within range of the radio by which it is being controlled. Believed to be the first application of remote control to a piece of construction equipment, the tractor may prove invaluable in construction work in radioactive and combat zones, and useful in various other tasks such as fighting large fuel storage fires.

From a jeep or helicopter equipped with a standard military radio and a special control box, an operator can start and stop the machine, engage and disengage gears, move it in forward and reverse, manipulate the dozer blade up and down, and actuate the steering mechanism. Normal operations can be performed from distances of up to fifteen miles, the practical range of the radio, using the buttons on the control box. The installation of small television cameras may allow the remote operator the ability to run the machine without the need of information relayed by a visual observer. Early tests have been conducted with the control station within viewing distance but the tractor will be operated from greater distances as the test schedule progresses.

The prototype is a standard commercial Le Tourneau-Westinghouse "tournadozer" with a standard military radio receiving set substituted for the operator's seat.

Telephone Relays

Philco Corporation's Government and Industrial Division has received a contract of approximately $10 million to build radio relay units and parts for the Army Signal Corps. These FM multi-band units are used as connecting stations for multi-channel field telephone circuits where the laying of telephone cable is not practicable, such as over water or rough terrain. Each unit has a range of thirty miles. The equipment is both portable and transportable, and is designed for long, hard service under all types of climatic conditions. The major electronic components are housed in shock-mounted, rain-tight cases to withstand rough handling and the largest individual pieces of equipment weigh one hundred pounds or less.

Operating a "robot" tractor with a jeep-borne radio-control

Signal Corps transmitter Diana

Celestial Echoes

Army Signal Corps engineers, using the giant radar transmitter Diana, have been bouncing radar signals off the moon which were successfully picked up by the Navy's Blossom Point, Md., Minitrack test station. The tests were set up to perfect a technique for testing the operation of the Minitrack Earth Satellite tracking stations in the Western Hemisphere. The receiving equipment used at Blossom Point is the Mark II Minitrack designed by the Naval Research Laboratory for use by volunteer radio tracking stations throughout the world.

The Ultimate Barrier?

Having broken the "sound barrier" and dealing already with the "heat barrier" and the "range and endurance barriers," aviation scientists are now turning their attention to the remaining barrier to future flight, the "human barrier." A team of Lockheed Aircraft Corp. scientists are conducting an experiment to test the endurance of aviators and crew members on extended flights such as those foreseen in the unlimited range of the potential nuclear-powered airplane—and possible flights into outer space.

In order to learn the limits of human capacity for sustained flight under difficult and unusual conditions the tests will confine crews in a full-scale mock-up of a small flight station for five-day periods, while experts on human behavior investigate the effects of long confinement in a minimal space.

Flying Jeeps

The Army's Transportation Research and Engineering Command has let three contracts totalling $1,702,000 for the construction and testing of flying counterparts of the famed and versatile World War II Jeep. The contracts were awarded the Aerophysics Development Corp. ($388,000), Chrysler Corp. ($661,000), and Piasecki Helicopter Corp. ($653,000).

The projected new vehicle's low silhouette and protected rotor blades will give it a decided advantage over ordinary helicopters, allowing it to hug the ground, to operate in all kinds of weather, in streets, between buildings and among trees, its agility and small size permitting quick movement and easy concealment and camouflage.

Tiny Timer Tube

A timer tube the size of a cigarette filter tip has been developed by Raytheon Manufacturing Co. The new tube shows how long a radio or TV tube, or other electronic device has been operating and is expected to help prevent costly breakdowns of expensive and vital equipment.

One inch long, three-eighths of an inch in diameter and weighing less than one-sixth of an ounce the timer tube runs on about the same amount of energy generated by a flea. It is completely self-sealed and impervious to surrounding conditions, operating equally well in hot or cold temperatures, immersed in liquid, and in any position.

HOT SPARKS

The electronic control system of Nike antiaircraft batteries, Missile Master, will also control and coordinate the firing of the Hawk, the recently developed low-altitude air defense missile.

The Army Ordnance Corps has awarded contracts amounting to $6,783,424 to Willys Motors, Inc., for production of the existing model of the Mechanical Mule and for further work on an advanced version.

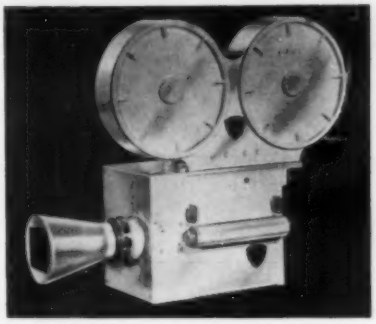
The Army's Corps of Engineers R&D Laboratories have developed a spark and flame arresting muffler to reduce fire hazards caused by engine exhaust of fork-lift trucks and other vehicles operating in congested and highly combustible areas.

A new radiant heater, the Mobileray, for small coaches and travel trailers has been announced by the Carrier Corp. Mobileray is being produced in two models for floor or wall mounting and can operate on natural or LP gas.

In two years of Air Force use the more than 200 Fairchild C-123 assault-logistics transports have been involved in less than ten accidents. Three of these occurred during extremely hazardous DEW Line operations. None of them involved fatalities and none were attributable to mechanical failure or faulty design.

The Radio Corporation of America has realigned its Defense Electronic Products organization to provide military customers with broader technical and marketing services for current and long-range needs in military electronics.

More of the Army's tactical military tire recapping program will be let on contract to private industry. During Fiscal Year 1958 an estimated 60,000 tactical tires will be recapped by civilian companies at a cost of approximately $1,000,000. The five recapping shops presently operated by the Army will be retained with a minimum workload, mainly for research and testing.



Super-speed camera

Fast Filming

Photo-Sonics, Inc., has developed a new 2,800-frame-per-second instrumentation camera intended primarily for research in missile and related rapid-motion projects in which photography is employed to analyze phenomna of very short duration. The camera utilizes a rotating prism which allows continuous flow of film while compensating for image distortion and a rotating disc shutter providing exposure control with a high shutter efficiency. A removable film chamber has a capacity of 500 feet.

Cool Man, Cool

An aluminized suit which is lightweight and flexible enough to permit the wearer to work, yet will protect him from temperatures of more than 2,000 degrees Fahrenheit, has been introduced by Fyrepel Products, Inc. The suit is made of a glass fiber material with a microthin coating of aluminum which reflects 95 percent of the radiant heat.

No hotfoot for suit tester

ASSOCIATION OF THE U. S. ARMY

Aims and Objectives

The Association of the U. S. Army shall be an organization wherein all who are in accord with its objectives may join in the exchange of ideas and information on military matters, and in fostering, supporting, and advocating the legitimate and proper role of the Army of the United States and of all its elements, branches, and components and providing for and assuring the Nation's military security.

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Membership

General Membership. General membership in the Association shall be open to any individual who has been honorably discharged or retired from the Armed Forces of the United States, to members of the National Guard of the United States not on active duty, to members of the United States Army Reserve not on active duty, and to such persons as have held appointive office in the Department of the Army.

Service Membership. Service membership in the Association shall be open to all active-duty members of the Army of the United States.

Cadet Membership. Cadet membership in the Association shall be open to the cadets of the United States Military Academy and to all current enrollees in Junior, Military Schools, and Senior Divisions of the Army ROTC Program, including those units provided for by Section 55c of the National Defense Act as amended.

Associate Membership. Associate membership shall be open to active-duty personnel of the other services, to civilian employees of the Department of the Army not qualified for General Membership, and to any individual who supports the objectives of the Association and who meets such requirements as may be promulgated in regulations passed by the Council of Trustees.

Sustaining Membership. Sustaining membership shall be open to such industrial, commercial, business, professional, technical and veteran firms, corporations, organizations or societies that wish to support the aims and purposes of the Association, subject to specific approval by the Council of Trustees.

REPORT FROM YOUR AUSA CP

Resolutions to be screened by the Resolutions Committee for consideration of the Council prior to the Annual Meeting must be received in National Headquarters in Washington by 28 September 1957.

In July the 24th Infantry Division sent 331 applications for membership in the Association. This splendid Division has been a continuous strong supporter. For the second straight year the Transportation Terminal Command (7278) at St. Johns, Newfoundland, announces that 100 per cent of its Regular and career Reserve officers are members of the Association. This Polar post has been most active in its support of the Association, for which we express appreciation and thanks. Headquarters and Headquarters Battery, VII Corps Artillery, recently sent in 24 new memberships. Here is further evidence of the support we are getting from fine overseas units. The Special Activities Division of U. S. Army, Europe, has several hundred members, military and civilian, in the Association, and efforts are continuing to add more. In January 100 per cent of the officers had joined. This "special activity" is one we really appreciate.

We have received letters indicating that in some instances new memberships have been obtained by "high pressure" salesmanship. Such memberships are not lasting—in fact, requests for cancellation have brought this whole subject to our attention. Members obtained by these methods are generally the ones who complain the most—hence they become liabilities instead of assets. We want members who believe in the aims and objectives of the Association and not those who are coerced to join by over-enthusiastic supporters.

Suggestions that a newsletter or something similar be printed and distributed to all members have been received. This newsletter would contain more detailed information on what the Association is doing. Unfortunately we cannot bear the additional expense at this time. It now costs approximately four dollars per year to edit, publish and distribute twelve issues of *ARMY* to each member. This is a non-profit organization—we don't want to raise the membership dues—we have to manage our pennies very carefully in order to give you the quality magazine we are now publishing—so we can't initiate another publication now. However the matter is receiving the serious consideration of the Council of Trustees.

As all but our newest readers know, most of the articles in *ARMY* are written by members of the Army, active and inactive, and of all branches and components. This is natural because there is no other group as capable of writing on military subjects. We will, of course, continue to publish articles by persons who are not connected with the Army when they are of interest to our readers, but we will continue to rely largely on the contributions of our military readers. We invite your contribution—it will receive the full and careful consideration of the editorial staff. Obviously, we can't promise to publish everything we receive. However, the more material we receive the more selective we can be and hence a better magazine will result. We especially invite those who are qualified to write on Army topics which we have not covered recently. If you have an idea for an article but aren't sure whether we would be interested in it, drop us a line and we'll give you all the information and help we can. The editorial staff is presently in the process of compiling a small booklet containing information and advice for those of our readers who would like to contribute to *ARMY*. The booklet isn't ready but we urge you not to wait for it. Write to us now if you would like to contribute.

In common with all organizations such as AUSA, your national headquarters has a regular series of notices that are automatically mailed to a member whose membership is about to expire. Our membership-renewal procedure requires the first notice to be mailed 60 days before a membership is due to expire, and subsequent notices at thirty-day intervals thereafter. When we receive the renewal of a member we adjust our records immediately so that he will receive no more notices. In some cases (especially from members serving overseas), returned renewals and checks extending membership do not reach us before the next notice is mailed. This is caused by a combination of the time it takes to process outgoing notices and incoming returns and by the in-transit mail time. We hope you will understand and hence disregard any renewal notice you may receive within four or five weeks after you have sent in your renewal. You will know that we received your renewal when you receive your new membership card, which is normally mailed within ten days after receipt of your renewal.

The same time lag exists in the "bill-me-later" applications for membership. If you receive another bill within two or three weeks after you have sent in your payment, please disregard it. In all instances please return your renewal notice or invoice with your payment.

Of course, if you don't receive your membership card or your check doesn't clear your bank in a reasonable length of time, you should write us. But you'll be saving yourself and your national headquarters staff extra work if you'll allow sufficient time before doing so.

Our congratulations to one of our Council of Trustees, Lt. Gen. Milton G. Baker, PaNG, Retired, who on 24 July 1957 was presented the Meritorious Civilian Service Award by C. E. Wilson, Secretary of Defense, for his "outstanding contribution to the Reserve Program during the period he served as Chairman of the Reserve Forces Policy Board, from September 1955 to September 1957."

WALTER L. WEIBLE
Lt. Gen., USA, Retd.
Executive Vice President

AUSA REGIONAL ACTIVITIES

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FORT BENNING. The USA Advanced Marksmanship Unit, training headquarters for the Army's rifle and pistol teams, signed up all 30 of its officers as members of AUSA, the first unit assigned or attached to The School Brigade to rack up 100 per cent. Capt. Edward J. Gotthelf, III *(left)*, AMU adjutant, shows unneeded membership applications after being congratulated by his CO, Lt. Col. E. R. Mason *(right)*. In rear is membership thermometer on which weekly tally was scored

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Geographic area: Fort Dix, New Jersey

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Col. Robert F. Cocklin, Assistant Secretary of the national Association and Advertising and Promotion Director of *ARMY* reported on AUSA activities at meeting held 12 July. President Meese appointed Public Affairs Committee with Maj. Gen. William F. Dean as Chairman, and including Mr. Arthur C. Ames and Col. Bernard J. Kitt.

EL PASO CHAPTER

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Charter meeting held 12 July 1957. Among those attending dinner meeting were 30 civilian members from nearby communities, 60 from Killeen Base, 29 representatives of educational institutions whose cadets were in training at Fort Hood, four AUSA ROTC Company Captains, General Phinney and General Ives of the 36th Division,

and DACs and military personnel from Fort Hood. Dr. Evan A. Reiff, President of Hardin-Simmons University, responded to the introduction of the honored guests. General del Mar, President of the Chapter, presented the charter to Maj. Gen. W. N. Gillmore, Post Commander.

Brig. Gen. Bogardus S. Cairns, Chief, Army Aviation Center, Fort Rucker, spoke on the history and future of Army Aviation.

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FRANKFORD ARSENAL CHAPTER

Secretary: Mr. Reuben Levine, Frankford Arsenal, Philadelphia 37, Pa. *President:* Dr. William J. Kroeger; *First Vice President:* Mr. Harry F. Devlin; *Second Vice President:* Mr. George S. VanDyke, Jr.; *Treasurer:* Mr. Kenneth E. Yocum.

GARRY OWEN CHAPTER

Secretary: Major Harry W. Rollins, Hq 7th Cavalry Regt., APO 201, San Francisco, California. *President:* Lt. Col. William T. Rogers; *First Vice President:* Major Bruce S. Eldridge; *Second Vice President:* Capt. James T. Ceka; *Treasurer:* 1st Lt. Ronald R. Berkey.

GENERAL JOHN J. PERSHING CHAPTER

Treasurer: Lt. Col. Harland L. Dodge, c/o Comptroller Section, Hq First U. S. Army, Governors Island, New York. *President:* Col. Sidney G. Brown, Jr.; *First Vice President:* Col. Harry C. Keeney; *Second Vice President:* MSgt John A. Butler; *Secretary:* Major George I. Stoeckert; *Legal Officer:* 1st Lieutenant Sheldon Cohen.

HAWAII CHAPTER

Secretary: Major Charles D. Flinn, Hq. U. S. Army Pacific, APO 958, San Francisco, California. *President:* Lt. Gen. Henry S. Aurand, USA-Rtd.; *First Vice President:* Brig. Gen. Kendall J. Fielder, USA-Rtd.; *Second Vice President:* Maj. Gen. Fred W. Makinney, NGUS; *Third Vice President:* Col. Percy H. Johnston, USAR; *Treasurer:* Capt. Kenneth Y. H. Ahana.

HEADQUARTERS SEVENTH U. S. ARMY CHAPTER

President: Major Gen. John C. Oakes, Hq Seventh U. S. Army, APO 46, New York, N. Y.; *Honorary President:* Lt. Gen. Bruce C. Clarke; *First Vice President:* Col. Robert H. Cole; *Second Vice President:* Lt. Col. William O. Quirey; *Secretary:* Major Thomas A. Gandy, Jr.; *Treasurer:* Major Andrew C. Anderson.

HEIDELBERG CHAPTER

Secretary: Capt. A. L. Shoaff, Hq USAREUR, APO 403, New York, New York. *President:* Major Gen. G. E. Martin; *First Vice President:* Col. K. E. Adamson; *Second Vice President:* Col. S. E. Otto; *Treasurer:* Major W. H. Brandenburg.

NEW ORLEANS. The Hon. de Lesseps Morrison (Brig. Gen., USAR), Mayor of New Orleans, signs the proclamation declaring 23-29 June AUSA Week in his city. Maj. Gen. N. H. Vissering, CG, USA Transportation Terminal Command, Gulf, looks on. The Mayor called upon the citizens of New Orleans to join him in expression of faith, support and good wishes for the New Orleans Chapter of AUSA.

HENRY LEAVENWORTH CHAPTER

Secretary: Maj. John H. Cushman, Fort Leavenworth, Kans. *President:* Lt. Col. Harold A. Purdy, USAR; *First Vice President:* Mr. John W. Breidenthal; *Second Vice President:* Col. John H. Hay; *Treasurer:* Mr. George H. Ryan.

INDIANA CHAPTER

Treasurer: Major Alfred F. Ahner, Room 212 State House, Indianapolis, Indiana. *President:* Brig. Gen. Wendell C. Phillippi, NGUS; *First Vice President:* Col. John C. Carvey; *Second Vice President:* Brig. Gen. John W. McConnell; *Secretary:* Col. Harsel Harris.

KELLY BARRACKS CHAPTER

Secretary: Lt. Col. Henry T. Agee, Hq VII Corps, APO 107, New York, N. Y. *Honorary President:* Lt. Gen. John F. Uncles; *President:* Brig. Gen. Charles E. Beauchamp; *First Vice President:* Col. William B. Kunzig; *Second Vice President:* Col. Edson D. Raff; *Treasurer:* CWO-2 Alfred J. Buza.

KENTUCKIANA CHAPTER

Secretary: Capt. Clarence W. Pratt, General Delivery, Fort Knox, Kentucky. *President:* Col. George M. Chescheir, Rtd.; *First Vice President:* Maj. Gen. Paul A. Disney; *Second Vice President:* Lt. Col. Julio Chiaramonte; *Treasurer:* Capt. Wilbur T. Whitehead; *Asst. Secretary:* MSgt Robert J. McDonald.

LAWTON-FORT SILL CHAPTER

Secretary: Maj. Rawlins M. Morris, P.O. Box 84, Lawton, Okla. *President:* Mr. George Page; *First Vice President:* Mr. Milton Wor-

ley; *Second Vice President:* Mr. Floyd Zook; *Treasurer:* Brig. Gen. John F. Bird, Rtd.

McCOY-RED CLOUD CHAPTER

Secretary: Mr. Robert Ninnenman, Tomah, Wisc.; *President:* Mr. Frederic D. Rahr; *First Vice President:* Mr. Don Harris; *Second Vice President:* Mr. John Kaehler; *Treasurer:* Mr. Stuart Latimer.

Geographic area: Counties of Jackson, La Crosse, Monroe, Juneau, and Vernon in Wisconsin.

MILWAUKEE CHAPTER

Secretary: Mr. George Comte, c/o The Wisconsin Military District, Federal Post Office Building, Milwaukee, Wisconsin. *President:* Brig. Gen. Don E. Carleton; *First Vice President:* Mr. G. M. Taylor; *Second Vice President:* Lt. Col. Roth S. Schleck; *Treasurer:* Maj. Frank X. Mages.

MONTEREY COUNTY CHAPTER

Secretary: Mr. Richard Bennett, Pebble Beach, California. *President:* Col. Allen Griffin, AUS-Rtd.; *First Vice President:* Mr. Joseph Juri; *Second Vice President:* Maj. Gen. Robert B. McClure, Rtd.; *Treasurer:* Col. Frank A. Heywood, Rtd.

MOTHER LODE CHAPTER

Secretary-Treasurer: Lt. Col. William L. Shaw, NGUS, 3701 College Ave., Sacramento, Calif. *President:* Brig. Gen. A. M. Shearer, Rtd.; *First Vice President:* Mr. E. A. Combatalade; *Second Vice President:* Mr. George E. Holt.

NEW ORLEANS CHAPTER

Secretary: Maj. Louis Robillia, Jr., USAR, 4400 Dauphine St., New Orleans, Louisiana. *President:* Mr. Wallace M. Davis; *First Vice President:* Col. Donald E. MacDonald, USAR-Rtd.; *Second Vice President:* Brig. Gen. Robert V. Maraist, USA-Rtd.; *Third Vice President:* Mr. Jonas C. Sporl; *Treasurer:* Mr. Newton D. McLean.

NEW YORK CHAPTER

President: Lt. Colonel Charles I. Katz, USAR, 250 West 57th Street, New York 19, New York. *First Vice President:* Col. Arthur D. Hirt, USAR; *Second Vice President:* Lt. Col. Pelham St. George Bissell, III, USAR; *Secretary:* Major Emilie L. Berkley, USAR; *Treasurer:* Lt. Col. Lloyd W. Stearns, USAR.

PIKES PEAK CHAPTER

Secretary: Lt. Col. Frank A. Golbey, USA-Rtd., P.O. Box 2442, Colorado Springs, Colorado. *President:* Lt. Col. J. D. Ackerman, USAR; *Executive Vice President:* Major Gen. William H. Gill, USA-Rtd.; *Vice President for Membership:* Mr. George S. Winters; *Vice President for Programs:* Mr. Samuel T. Jones, Jr.; *Treasurer:* Major H. C. Fleming, Jr., USAR.

POLK CHAPTER

Secretary: Lt. Col. John W. Rodgers, Fort Polk, La. *President:* Mr. F. E. Hernandez; *First Vice President:* Mr. P. Hoyt Hays; *Second Vice President:* Mr. Albert J. Carter; *Treasurer:* Mr. J. R. Monk, Jr.

SAN BERNARDINO COUNTY CHAPTER

Secretary: MSgt Claire Hunt, 16th Armor Group, Camp Irwin, Calif.; *President:* Mr. George W. Savage; *First Vice President:* Mr. Victor J. Smith; *Second Vice President:* Lt. Col. Christian E. Petersen, AUS-Rtd.; *Treasurer:* SFC Gerald Morgan.

SAN FRANCISCO CHAPTER

Secretary: Col. C. C. W. Allan, Office of the Deputy Chief of Staff, Hq Sixth U.S. Army, Presidio of San Francisco, California. *President:* Mr. Frederick M. Fisk; *First Vice President:* Lt. Gen. Claude B. Ferenbaugh, USA-Rtd.; *Second Vice President:* Mr. William M. McNabb; *Treasurer:* Mr. Albert Leslie.

SEATTLE CHAPTER

Chairman pro tem: Mr. Joseph A. Sweeney, 917 Arctic Bldg., Seattle 4, Washington; *Secretary pro tem:* Col. Hal Randall.

SOUTHEASTERN NEW MEXICO CHAPTER

Secretary: PFC William I. Anderson, Office of the Unit Advisor (USAR), Municipal Airport Building, Roswell, New Mexico. *President:* Lt. Col. Thomas B. Stapp, USAR; *First Vice President:* Lt. Col. James B. Stapp; *Second Vice President:* 1st Lt. Burl J. Wilkerson; *Treasurer:* Capt Maurice P. Hinman.

WASHINGTON STATE CHAPTER NO. 1

Secretary: Lt. Col. John A. Spencer, Fort Lewis Exchange, Fort Lewis, Washington. *President:* Col. James Stack, USA-Rtd.; *First Vice President:* Mr. Harry L. Minor; *Second Vice President:* Mr. Fred Osmers; *Treasurer:* Mr. Carl Phillips.

Meeting 16 June, at Fort Lewis Officers Club, began with buffet and entertainment by soldiers of Fort Lewis Special Service Entertainment Division. Colonel Gerhardt, CO, 31st AAA Brigade, invited chapter members to visit Nike sites in area during last two weeks of July. Chapter presented General Young, CG, Sixth U.S. Army, cuff links and tie clasp with three-star insignia. Mr. Frank Baker, publisher of Tacoma *News Tribune,* honored guest at this meeting. Committees appointed include Membership, Program, Public Relations, Resolution and Legislature, Doctrine and Policy, West Point, and Armed Forces.

Chapter publishes mimeographed *Information Bulletin* to keep members informed of meetings, projects, and invitations to civic and military functions.

WOLTERS CHAPTER

Corresponding Secretary: Capt. John J. Peterson, Office of the Provost Marshal, Camp Wolters, Tex. *President:* Mr. Fred Brown; *First Vice President:* Mr. Harry Hopkins; *Second Vice President:* Mr. Orval W. Shore; *Third Vice President:* Col. John L. Inskeep; *Recording Secretary:* Mr. Malcolm Maupin; *Treasurer:* Mr. I. R. Preston.

ROTC COMPANIES

CANISIUS COLLEGE COMPANY

Canisius College, Buffalo, New York

Captain: Cadet Daniel T. Kirst; *First Lieutenant:* Cadet Thomas R. Block; *Second Lieutenant:* Cadet Joseph S. DePaolo; *First Sergeant:* Cadet Daniel W. Sullivan.

CITADEL COMPANY

The Citadel, Charleston, S. C.

Captain: Cadet Edwin C. King; *First Lieutenant:* Cadet Terry D. Cordell; *Second Lieutenant:* Cadet Charles M. Watson, Jr.; *First Sergeant:* Cadet Jimmie E. Jones, Jr.

CLARKSON COMPANY

Clarkson College of Technology, Potsdam, New York

Captain: Cadet Donald Broadhurst; *First Lieutenant:* Cadet Robert F. Koenig; *Second Lieutenant:* Cadet Charles Fish; *First Sergeant:* Cadet Sigmund Mierzwa.

DAKOTA COMPANY

North Dakota Agricultural College, Fargo, N. D.

Captain: Cadet Arnold Ellingson; *First Lieutenant:* Cadet Neal R. Bjornson; *Second Lieutenant:* Cadet Melvin G. Werth; *Social Chairman:* Cadet Curtis L. Stromstad; *First Sergeant:* Cadet W. Dale Ruff.

DICKINSON COLLEGE COMPANY

Dickinson College, Carlisle, Pa.

Captain: Cadet Wilbur M. Otto; *First Lieutenant:* Cadet Fred Conrad; *Second Lieutenant:* Cadet William Rogers; *First Sergeant:* Cadet Dick Schafer; *PIO Sergeant:* Cadet William Black.

DUQUESNE UNIVERSITY COMPANY

Duquesne University, Pittsburgh 19, Pa.

Captain: Cadet James King; *First Lieutenant:* Cadet John Vensel; *Second Lieutenant:* Cadet John Sullivan; *First Sergeant:* Cadet Alfred Eisenacher.

EDMUND R. WALKER COMPANY

University of Connecticut, Storrs, Conn.

Captain: Cadet Francis E. Dion, Jr.; *First Lieutenant:* Cadet Liudas Bajorinas; *Second Lieutenant:* Cadet Howard M. Belinsky; *First Sergeant:* Cadet Edward H. Soderberg.

ILLINI COMPANY

University of Illinois, Champaign, Illinois

Captain: Cadet Armand Ferrini; *First Lieutenant:* Cadet Kenneth Weber; *Second Lieutenant:* Cadet Charles W. Thompson; *First Sergeant:* Cadet Ray L. Allison.

JOHN CARROLL UNIVERSITY COMPANY

John Carroll University, Cleveland 18, Ohio

Captain: Cadet Thomas Halloran; *First Lieutenant:* Cadet Ronald Brill; *Second Lieutenant:* Cadet George Pfeiffer; *First Sergeant:* Cadet Jerry Porter.

LOUISIANA STATE UNIVERSITY COMPANY

Louisiana State University, Baton Rouge 3, La.

Captain: Cadet Freddy M. Keegan; *First Lieutenant:* Cadet Bobby K. Bush; *Second Lieutenant:* Cadet Fred C. Dent; *First Sergeant:* Cadet Charles A. Travis.

LOYOLA COLLEGE COMPANY

Loyola College, Baltimore 10, Md.

Captain: Cadet T. McHugh; *First Lieutenant:* Cadet K. Lee; *Second Lieutenant:* Cadet J. Murphy; *First Sergeant:* Cadet L. Romeo

MOCCASIN COMPANY

University of Chattanooga, Chattanooga, Tenn.

Captain: Cadet John Doyle; *First Lieutenant:* Cadet Hoyt Jenkins; *Second Lieutenant:* Cadet Lawrence Putnam; *First Sergeant:* Cadet Thomas Murphy.

THE MONTANA STATE UNIVERSITY ARMY ROTC COMPANY

Montana State University, Missoula, Montana

Captain: Cadet Ronald W. Lundquist; *First Lieutenant:* Cadet Donald E. Ochs; *Second Lieutenant:* Cadet William P. Erhard; *First Sergeant:* Cadet Otto A. Bessey.

NEW YORK UNIVERSITY HEIGHTS COMPANY

New York University, New York, N. Y.

Captain: Cadet Anthony Lauria, Jr.; *First Lieutenant:* Cadet Roland Stickle; *Second Lieutenant:* Cadet Michael Katos; *First Sergeant:* Cadet Frank Stein.

ROTC MEDAL AWARDS

AUSA ROTC Medals have been awarded to the following cadets through 31 July 1957

Bowdoin College ..... Cadet Col. Joseph W. McDaniel
Colorado State University ..... Cadet Maj. Robert V. Hubbard
Montana State College ..... Cadet Lt. Col. Gerald E. Pelzl
Stanford University ..... Senior Cadet Robert Emory Hurley
Stanford University ..... Junior Cadet Charles A. Bonniwell, III

PENNSYLVANIA STATE UNIVERSITY COMPANY

The Pennsylvania State University, University Park, Pa.

Captain: Cadet George L. Beal; *First Lieutenant:* Cadet Thomas G. Hart; *Second Lieutenant:* Cadet Keith F. Vansant; *First Sergeant:* Cadet Frank H. Morris.

ROBERT E. SYLVEST COMPANY

Northwestern State College of Louisiana, Natchitoches, La.

Captain: Cadet Robert F. Kelley; *First Lieutenant:* Cadet Gerard Schorr; *Second Lieutenant:* Cadet Donald G. Walker; *First Sergeant:* Cadet George C. Davis.

ST. NORBERT COLLEGE COMPANY

St. Norbert College, West de Pere, Wisconsin

Captain: Cadet John T. Wilting; *First Lieutenant:* Cadet Raphael J. Hallada; *Second Lieutenant:* Cadet Robert E. Jossart; *First Sergeant:* Cadet James J. Reilley.

Meeting 29 May discussed plans and laid groundwork for 1957-58 programs. Major Cutrona, Company Advisor, spoke on supply responsibility as it applies to the newly-commissioned officer and the cadet at summer camp.

SIENA ROTC COMPANY

St. Bernardine of Siena College, Loudonville, New York

Captain: Cadet Paul R. Riley, Jr., *First Lieutenant:* Cadet John W. Stahlman; *Second Lieutenant:* Cadet Louis R. La Gasse; *First Sergeant:* Cadet J. Vincent Chesterfield.

TEXAS CHRISTIAN UNIVERSITY COMPANY

Texas Christian University, Fort Worth 9, Texas

Captain: Cadet Larry Lands; *First Lieutenant:* Cadet Frank Hyde; *Second Lieutenant:* Cadet Kenneth Howard; *First Sergeant:* Cadet Jimmy Lindsey; *Sergeants:* Cadets Ronnie Coleman, George Depee, Joe Dulle and Robert Fleming.

TEXAS TECH COMPANY

Texas Technological College, Lubbock, Texas

UNIVERSITY OF DETROIT CAVALIER COMPANY

University of Detroit, Detroit 21, Michigan

Captain: Cadet Daniel Potter; *First Lieutenant:* Cadet James Murphy; *Second Lieutenant:* Cadet Ronald Felice; *First Sergeant:* Cadet Michael J. Wells.

UNIVERSITY OF IDAHO COMPANY

University of Idaho, Moscow, Idaho

Captain: Cadet Curtis E. Anderson, Jr.; *First Lieutenant:* Cadet Warren G. Hawley; *Second Lieutenant:* Cadet Gary G. Sturman; *First Sergeant:* Cadet Larry P. McDonald.

UNIVERSITY OF TEXAS COMPANY

University of Texas, Austin 12, Texas

Captain: Cadet Donald Raynsford; *First Lieutenant:* Cadet Charles C. Mason; *Second Lieutenant:* Cadet Don K. Meier; *First Sergeant:* Cadet Mark S. Smith.

VALLEY FORGE COMPANY

Valley Forge Military Academy, Wayne, Pa.

Captain: Cadet Arthur C. Keogh; *First Lieutenant:* Cadet John H. Clark; *Second Lieutenant:* Cadet F. Arthur Rogers; *First Sergeant:* Cadet J. Robert Lance.

WEST TEXAS STATE COMPANY

West Texas State College, Canyon, Tex.

Captain: Cadet John C. Middleton; *First Lieutenant:* Cadet Wil-
West Texas State College, Canyon, Tex.
liam G. Plummer; *Second Lieutenant:* Cadet James G. Coleman; *First Sergeant:* Cadet Gene E. Glazener.

THE MONTH'S BOOKS

From 20 Tons to 20 Million

THE EFFECTS OF NUCLEAR WEAPONS
Edited by Samuel Glasstone
Government Printing Office, 1957
557 Pages; Illustrated; Index; $2.00 (paper)

Reviewed by
COL. GEORGE C. REINHARDT, *USA, Retired, co-author with Col. W. R. Kintner of* Atomic Weapons in Land Combat, *and now on the staff of The RAND Corporation.*

Deceptively similar in external appearance and format to its seven-year-old professional forebear, this new unclassified official "progress report reflects the leaps-and-bounds advance in nuclear science. "Atomic" has become "Nuclear" in the title because that "correctly describes" both "atomic weapons in which the energy arises from fission and hydrogen (or thermonuclear) weapons involving fusion."

Chapter titles, and even many subheads will be familiar to readers of the 1950 edition. Only Chapter X, "World-Wide Fallout and Long-Term Residual Radiation ("Decontamination" in the earlier work), is unrecognizably altered; "underwater and underground bursts" have become "surface and subsurface bursts"; and the last chapter is "Protective Measures" instead of "Protection of Personnel."

Despite the omission of the five appendixes, some 120 more pages help the new volume serve lay readers much better than the old one. Nine chapters are in two parts: "first a general treatment in a less technical manner" and then a section which "contains the more technical aspects." As the preface assures, "no loss of continuity results from the omission (by the reader) of these more technical sections."

Yet, fundamental to the world-shaking technological changes during the interval between these two governmental scientific reports, is the difference in the basic data described. This edition's foreword explains that "effects information herein is *calculated for yields up to 20 megatons;* scaling laws for hypothetically *extending the calculations beyond this limit* are given" (italics supplied). This compares with the old edition's "nominal bomb, equivalent to 20,000 tons (20 KT) of TNT" although an occasional graph did "extrapolate" to a daring maximum of 200 KT.

Thus, the new edition describes test results from explosive power three full orders of magnitude greater than did the old, which in its turn discussed weapons of about a thousand times the energy of the mightiest iron bomb that preceded it. From 20 tons to as many millions of tons in a decade, contrasting with the centuries required to deliver a World War II blockbuster, suggests the apocalyptical impact of *The Effects of Nuclear Weapons.* For a single book (readily comprehended, except for certain "more technical aspects") to undertake to describe such awful phenomena, explains its august parentage (Department of Defense plus Atomic Energy Commission) no less than its vital reader interest.

The sheer bulk of data superbly briefed and extensively supported by simple graphs and nomograms presents for the first time, unclassified information essential to public education in the ominous and hitherto vaguely debated facts of our nuclear age. A few examples should whet the appetite for the full meal.

Strontium-90 effects (long- or short-term) will not be detectable from nuclear tests continued "at about the same rate as in the past."

"The degree of internal hazard due to fallout is small," according to actual check of exposed Marshall Islanders in March 1954. This confirms medical theories which to date have been unable to scotch excessive alarm over radioactive contamination of food and water or fear of the even smaller risk—injury by dust inhalation.

Design specifications are represented by a drawing of a modest-sized shelter actually tested to withstand peak overpressures of 100 pounds per square inch, a useful sortie into practical application of scientific data. As for evacuation, "this book is of value only as an aid to determining what might constitute a safe distance for evacuees, bearing in mind that the effect of fallout enormously complicates the problem by producing a hazard far beyond the zone of direct damage."

Fallout receives extensive coverage, such as the easier task of shielding against it (compared to initial radiation). Each 3.3 inches of earth or 2.2 inches of concrete cuts residual radiation by half, although equivalent protection against initial gamma rays calls for 7.5 inches of earth or 6 inches of concrete. "High or moderately high air bursts," even in the megaton range, reduce "residual nuclear radiation" (the source of fallout) to "minor consequences on the ground." Hence, clarification of discussions about employing nuclear weapons in air defense above the heads of friendly populations.

Previous conjecture regarding the effects of nuclear weapons upon forests, among many other items, is replaced by tables showing that megaton bursts will transform them into debris for distances of five to fifteen miles from ground zero.

The once highly touted "radiological warfare" threats are shown to be myths; but large-yield weapons exploded on or under the ground produce through their fallout many of the effects once claimed for radwar. The intensity, duration and extent of fallout under varying conditions can be figured from tables and graphs along with novel bits of advice that the "infinity dose computed from one minute after detonation" is always 11.3 times the H plus 1 dose rate (in roentgens); that 77 per cent of the total radiation occurs in the first twenty-four hours with only 3 per cent additional in the second day. Ten percent of the "infinity dose" can still be accumulated in a radioactive area entered after 83 days.

Biological effects of *acute* doses of radiation are spelled out in detail. The sickness range is graphed between 100 and 300 r with fatalities appearing around 200 r and approaching 100 per cent around 600. Chronic doses, associated with exposures to fallout, are handled vaguely. Mildly encouraging is the assurance that the human body has the capacity to recover, at least partially, from "moderate chronic doses." (As a possible measure of "moderate," exposures of 25 to 100 r will produce only "mild and somewhat indefinite symptoms, exposed individuals should be able to proceed with their usual duties.") Limits prevailing in industry, .3 r per week or 15 r per year, "are felt to include a factor of safety." No stand is taken on the contentious question of maximum permissible "infinity dose" which has *elsewhere* been suggested as 1,000 r (compared to industry's 300 for 20 years).

The reviewer presumes that his advance copy is not the official last word, in view of errors noted even in a first reading. A reprinted page in the wholly new fallout chapter is pasted over one it replaces; an obvious misprint occurs in figure 3.97 (0.4 instead of 4.0); Table 9.35 and Figure 9.36 appear to contradict each other when determining shielding values of materials. Also, in Chapter IX "the very large amount of over a million pounds of plutonium" is set as a possible worldwide hazard. This, coupled with the earlier statement that one pound can produce 9 KT through "complete fission," suggests no more than 9,000 MT (much less if the efficiency of the fission were known) would involve the million pounds of plutonium. Such a hazard level is much lower than the range of SR-90 pollution levels confusingly termed much more dangerous. This may be explained by the fact that plutonium comprises a smaller part of the more advanced nuclear weapons and hence would not appear in large amounts. Doubtless the popular edition

will have eliminated proofreading slips which might weaken public confidence in this urgently needed, long-awaited report from our Government.

Of, By and For the People

THE CITIZEN ARMY: Key to Defense in the Atomic Age
By Frederick M. Stern
St. Martin's Press, 1957
356 pages; Bibliography; $6.00

Reviewed by
THE HONORABLE HUGH M. MILTON, II, *who is Assistant Secretary of the Army (MP&RF), and a Major General in the U. S. Army Reserve.*

In *The Citizen Army* Frederick Stern presents a strong argument for Universal Military Training as being the key to defense in the atomic age. Being extremely well documented, it provides a depth of discussion on the procedures for raising armies. It considers the historical background of the military manpower problems of many nations, the methods by which these governments created an army and the results achieved in relation to time and resources expended, with the main emphasis of comparison being placed on "the cadre-conscript army" as opposed to what the author terms a "citizen army."

For all who desire a detailed analysis in the various methods of conscription, Stern presents fully substantiated and in great detail the efforts, past and present, to provide sufficient trained manpower to implement the policies of nations. Based upon this analysis of the past, the author predicts future courses of action for the United States and other democracies.

In his summary of the problem, the author states: "The United States would seem to have a good chance of avoiding a world war fought with nuclear weapons —unless it should maneuver itself into a situation in which it had no choice but to hurl the first atomic or hydrogen bomb at its enemies."

Based upon this premise, he then draws a detailed comparison between the cadre-conscript *versus* the citizen army and in doing so presents to the military student the multi-faceted problem complete in every detail. In discussing the types of war which might be fought in the atomic era, Stern makes a strong case for large ground forces and an even stronger appeal for the development of large, trained reserve forces.

The foreword by Lieutenant General Lewis B. Hershey, Director of Selective Service, presents the best summarization of the publication:

"The material concerning the creation of Ready Reserve forces in this book is too valuable to be ignored by the people of the United States or other nations that want to preserve their freedom. Now more than ever the armed forces need large and effective Ready Reserves if they are to insure the nation's security and survival."

Stern demonstrates a keen appreciation and understanding of the relationship between man as one and man as many, and points out that the prime moving force of history has been man. In presenting the problem of generating morals and *esprit* within a conscript army, he provides an excellent foundation for his argument that in a democracy, it is the responsibility of all men to assist in the preservation of the democratic process of government and in so doing, that each has a responsibility to bear his part of the military obligation.

In an easy-to-read and understandable style, Frederick Stern outlines the duties and rights of citizenship as follows:

"In a democracy the citizen's rights and duties are inseparable. In fact in some of the most important civic functions right and duty are like the two sides of a coin. Belgium, Holland, Australia, and several other countries have made suffrage not only a universal right but also a universal duty, with fines for anyone who fails to cast a vote. Jury service, a civic right of the first order, is in most countries a duty that, in principle, nobody can refuse. If jurors were volunteers, the courts could easily become playgrounds for private interests and rackets. Education, a blessing and a burden for the nation and for every citizen, is another case where right and duty are inseparable. So, too, is membership and training in a citizen army; though now regarded mainly as a duty, it was formerly known primarily as a civic right—in fact as the supreme right of a citizen.

"Unfortunately this right, like the right to live in his country, to dwell unmolested in his home, and many other basic rights, is seldom appreciated until it is lost. But in every country that has experienced Nazi occupation the people have learned to cherish again their 'right to bear arms' which most of them had been used to regarding as a onerous obligation."

Selected Check List of the Month's Books

This run-down of some of the books received for review during the month preceding our deadline is to give our readers who like to follow current literature a monthly check list of the most important, useful and potentially popular books. Full reviews of some of these books will appear in this or subsequent issues. Any of these titles may be purchased through the Combat Forces Book Service. See page 80 for order coupon and a complete listing of Selected Books for Military Readers.

THE BEST SHORT STORIES OF WORLD WAR II. Edited by Charles A. Fenton. The Viking Press, 1957. 428 Pages; $5.95. Twenty short stories about World War II, including selections from Stephen Vincent Benét, William Faulkner, James Jones, Thomas Heggen, James A. Michener, Wallace Stegner, and Norman Mailer, among others. The editor who made the selections is a Ph.D., Assistant Professor of English at Yale, former RCAF tail-gunner. A literary, rather than a popular, selection.

COMBAT BENEATH THE SEA. By Major Willy-Charles Brou. Thomas Y. Crowell Company, 1957. 240 Pages; Illustrated; $3.95. A wide, short, somewhat superficial survey of frogman activities in World War II, but exciting reading for the layman.

COME WITH ME TO MACEDONIA. By Leonard Droban. Alfred A. Knopf, Inc., 1957. 344 Pages; $3.95. Extremely funny, if you believe all Civil Service people except the exceptions are spineless and stupid, and all military officers are unscrupulous and stupid. We hope the publisher makes money on this; there is no other excuse for publishing it.

A DICTIONARY OF CONTEMPORARY AMERICAN USAGE. By Bergen Evans and Cornelia Evans. Random House, 1957. 567 Pages; $5.95. One of the uncomfortable facts of life is that language keeps changing; what the word meant when you were in third grade isn't necessarily what it means today. This is a supplement to your dictionary, which tells meaning; this will give you the background and the usage. It belongs on your shelf between the dictionary and the thesaurus if you write anything.

THE ONE THAT GOT AWAY. By Kendal Burt and James Leasor. Random House, 1957. 292 Pages; Illustrated; $3.95. Franz von Werra made two abortive escapes from the British in England, and finally made good his departure from a train taking him to a Canadian prison camp. This is not only good adventure reading; it headlines once again the necessity for indoctrinating soldiers and airmen, even sailors, in the name-rank-service-number formula.

RUSSIA AGAINST THE KREMLIN. By Alexandre Metaxas. World Publishing Company, 1957. 189 Pages; $3.00. "They [the Russians] will never revert to capitalism . . . but they refuse to go on in the Stalin way. . . . They are seeking the elements of a new formula that will suit their new life. . . . It will be a cold revolution, not hot with its victims' blood."

THE MONTH'S BOOKS

From 20 Tons to 20 Million

THE EFFECTS OF NUCLEAR WEAPONS
Edited by Samuel Glasstone
Government Printing Office, 1957
557 Pages; Illustrated; Index; $2.00 (paper)

Reviewed by
COL. GEORGE C. REINHARDT, *USA, Retired, co-author with Col. W. R. Kintner of* Atomic Weapons in Land Combat, *and now on the staff of The RAND Corporation.*

Deceptively similar in external appearance and format to its seven-year-old professional forebear, this new unclassified official "progress report reflects the leaps-and-bounds advance in nuclear science. "Atomic" has become "Nuclear" in the title because that "correctly describes" both "atomic weapons in which the energy arises from fission and hydrogen (or thermonuclear) weapons involving fusion."

Chapter titles, and even many subheads will be familiar to readers of the 1950 edition. Only Chapter X, "World-Wide Fallout and Long-Term Residual Radiation ("Decontamination" in the earlier work), is unrecognizably altered; "underwater and underground bursts" have become "surface and subsurface bursts"; and the last chapter is "Protective Measures" instead of "Protection of Personnel."

Despite the omission of the five appendixes, some 120 more pages help the new volume serve lay readers much better than the old one. Nine chapters are in two parts: "first a general treatment in a less technical manner" and then a section which "contains the more technical aspects." As the preface assures, "no loss of continuity results from the omission (by the reader) of these more technical sections."

Yet, fundamental to the world-shaking technological changes during the interval between these two governmental scientific reports, is the difference in the basic data described. This edition's foreword explains that "effects information herein is *calculated for yields up to 20 megatons*; scaling laws for hypothetically *extending the calculations beyond this limit* are given" (italics supplied). This compares with the old edition's "nominal bomb, equivalent to 20,000 tons (20 KT) of TNT" although an occasional graph did "extrapolate" to a daring maximum of 200 KT.

Thus, the new edition describes test results from explosive power three full orders of magnitude greater than did the old, which in its turn discussed weapons of about a thousand times the energy of the mightiest iron bomb that preceded it. From 20 tons to as many millions of tons in a decade, contrasting with the centuries required to deliver a World War II blockbuster, suggests the apocalyptical impact of *The Effects of Nuclear Weapons*. For a single book (readily comprehended, except for certain "more technical aspects") to undertake to describe such awful phenomena, explains its august parentage (Department of Defense plus Atomic Energy Commission) no less than its vital reader interest.

The sheer bulk of data superbly briefed and extensively supported by simple graphs and nomograms presents for the first time, unclassified information essential to public education in the ominous and hitherto vaguely debated facts of our nuclear age. A few examples should whet the appetite for the full meal.

Strontium-90 effects (long- or short-term) will not be detectable from nuclear tests continued "at about the same rate as in the past."

"The degree of internal hazard due to fallout is small," according to actual check of exposed Marshall Islanders in March 1954. This confirms medical theories which to date have been unable to scotch excessive alarm over radioactive contamination of food and water or fear of the even smaller risk—injury by dust inhalation.

Design specifications are represented by a drawing of a modest-sized shelter actually tested to withstand peak overpressures of 100 pounds per square inch, a useful sortie into practical application of scientific data. As for evacuation, "this book is of value only as an aid to determining what might constitute a safe distance for evacuees, bearing in mind that the effect of fallout enormously complicates the problem by producing a hazard far beyond the zone of direct damage."

Fallout receives extensive coverage, such as the easier task of shielding against it (compared to initial radiation). Each 3.3 inches of earth or 2.2 inches of concrete cuts residual radiation by half, although equivalent protection against initial gamma rays calls for 7.5 inches of earth or 6 inches of concrete. "High or moderately high air bursts," even in the megaton range, reduce "residual nuclear radiation" (the source of fallout) to "minor consequences on the ground." Hence, clarification of discussions about employing nuclear weapons in air defense above the heads of friendly populations.

Previous conjecture regarding the effects of nuclear weapons upon forests, among many other items, is replaced by tables showing that megaton bursts will transform them into debris for distances of five to fifteen miles from ground zero.

The once highly touted "radiological warfare" threats are shown to be myths; but large-yield weapons exploded on or under the ground produce through their fallout many of the effects once claimed for radwar. The intensity, duration and extent of fallout under varying conditions can be figured from tables and graphs along with novel bits of advice that the "infinity dose computed from one minute after detonation" is always 11.3 times the H plus 1 dose rate (in roentgens); that 77 per cent of the total radiation occurs in the first twenty-four hours with only 3 per cent additional in the second day. Ten percent of the "infinity dose" can still be accumulated in a radioactive area entered after 83 days.

Biological effects of *acute* doses of radiation are spelled out in detail. The sickness range is graphed between 100 and 300 r with fatalities appearing around 200 r and approaching 100 per cent around 600. Chronic doses, associated with exposures to fallout, are handled vaguely. Mildly encouraging is the assurance that the human body has the capacity to recover, at least partially, from "moderate chronic doses." (As a possible measure of "moderate," exposures of 25 to 100 r will produce only "mild and somewhat indefinite symptoms, exposed individuals should be able to proceed with their usual duties.") Limits prevailing in industry, .3 r per week or 15 r per year, "are felt to include a factor of safety." No stand is taken on the contentious question of maximum permissible "infinity dose" which has *elsewhere* been suggested as 1,000 r (compared to industry's 300 for 20 years).

The reviewer presumes that his advance copy is not the official last word, in view of errors noted even in a first reading. A reprinted page in the wholly new fallout chapter is pasted over one it replaces; an obvious misprint occurs in figure 3.97 (0.4 instead of 4.0); Table 9.35 and Figure 9.36 appear to contradict each other when determining shielding values of materials. Also, in Chapter IX "the very large amount of over a million pounds of plutonium" is set as a possible worldwide hazard. This, coupled with the earlier statement that one pound can produce 9 KT through "complete fission," suggests no more than 9,000 MT (much less if the efficiency of the fission were known) would involve the million pounds of plutonium. Such a hazard level is much lower than the range of SR-90 pollution levels confusingly termed much more dangerous. This may be explained by the fact that plutonium comprises a smaller part of the more advanced nuclear weapons and hence would not appear in large amounts. Doubtless the popular edition

will have eliminated proofreading slips which might weaken public confidence in this urgently needed, long-awaited report from our Government.

Of, By and For the People

THE CITIZEN ARMY: Key to Defense in the Atomic Age
By Frederick M. Stern
St. Martin's Press, 1957
356 pages; Bibliography; $6.00

Reviewed by
THE HONORABLE HUGH M. MILTON, II, *who is Assistant Secretary of the Army (MP&RF), and a Major General in the U. S. Army Reserve.*

In *The Citizen Army* Frederick Stern presents a strong argument for Universal Military Training as being the key to defense in the atomic age. Being extremely well documented, it provides a depth of discussion on the procedures for raising armies. It considers the historical background of the military manpower problems of many nations, the methods by which these governments created an army and the results achieved in relation to time and resources expended, with the main emphasis of comparison being placed on "the cadre-conscript army" as opposed to what the author terms a "citizen army."

For all who desire a detailed analysis in the various methods of conscription, Stern presents fully substantiated and in great detail the efforts, past and present, to provide sufficient trained manpower to implement the policies of nations. Based upon this analysis of the past, the author predicts future courses of action for the United States and other democracies.

In his summary of the problem, the author states: "The United States would seem to have a good chance of avoiding a world war fought with nuclear weapons —unless it should maneuver itself into a situation in which it had no choice but to hurl the first atomic or hydrogen bomb at its enemies."

Based upon this premise, he then draws a detailed comparison between the cadre-conscript *versus* the citizen army and in doing so presents to the military student the multi-faceted problem complete in every detail. In discussing the types of war which might be fought in the atomic era, Stern makes a strong case for large ground forces and an even stronger appeal for the development of large, trained reserve forces.

The foreword by Lieutenant General Lewis B. Hershey, Director of Selective Service, presents the best summarization of the publication:

"The material concerning the creation of Ready Reserve forces in this book is too valuable to be ignored by the people of the United States or other nations that want to preserve their freedom. Now more than ever the armed forces need large and effective Ready Reserves if they are to insure the nation's security and survival."

Stern demonstrates a keen appreciation and understanding of the relationship between man as one and man as many, and points out that the prime moving force of history has been man. In presenting the problem of generating morals and *esprit* within a conscript army, he provides an excellent foundation for his argument that in a democracy, it is the responsibility of all men to assist in the preservation of the democratic process of government and in so doing, that each has a responsibility to bear his part of the military obligation.

In an easy-to-read and understandable style, Frederick Stern outlines the duties and rights of citizenship as follows:

"In a democracy the citizen's rights and duties are inseparable. In fact in some of the most important civic functions right and duty are like the two sides of a coin. Belgium, Holland, Australia, and several other countries have made suffrage not only a universal right but also a universal duty, with fines for anyone who fails to cast a vote. Jury service, a civic right of the first order, is in most countries a duty that, in principle, nobody can refuse. If jurors were volunteers, the courts could easily become playgrounds for private interests and rackets. Education, a blessing and a burden for the nation and for every citizen, is another case where right and duty are inseparable. So, too, is membership and training in a citizen army; though now regarded mainly as a duty, it was formerly known primarily as a civic right—in fact as the supreme right of a citizen.

"Unfortunately this right, like the right to live in his country, to dwell unmolested in his home, and many other basic rights, is seldom appreciated until it is lost. But in every country that has experienced Nazi occupation the people have learned to cherish again their 'right to bear arms' which most of them had been used to regarding as a onerous obligation."

Selected Check List of the Month's Books

This run-down of some of the books received for review during the month preceding our deadline is to give our readers who like to follow current literature a monthly check list of the most important, useful and potentially popular books. Full reviews of some of these books will appear in this or subsequent issues. Any of these titles may be purchased through the Combat Forces Book Service. See page 80 for order coupon and a complete listing of Selected Books for Military Readers.

THE BEST SHORT STORIES OF WORLD WAR II. Edited by Charles A. Fenton. The Viking Press, 1957. 428 Pages; $5.95. Twenty short stories about World War II, including selections from Stephen Vincent Benét, William Faulkner, James Jones, Thomas Heggen, James A. Michener, Wallace Stegner, and Norman Mailer, among others. The editor who made the selections is a Ph.D., Assistant Professor of English at Yale, former RCAF tail-gunner. A literary, rather than a popular, selection.

COMBAT BENEATH THE SEA. By Major Willy-Charles Brou. Thomas Y. Crowell Company, 1957. 240 Pages; Illustrated; $3.95. A wide, short, somewhat superficial survey of frogman activities in World War II, but exciting reading for the layman.

COME WITH ME TO MACEDONIA. By Leonard Droban. Alfred A. Knopf, Inc., 1957. 344 Pages; $3.95. Extremely funny, if you believe all Civil Service people except the exceptions are spineless and stupid, and all military officers are unscrupulous and stupid. We hope the publisher makes money on this; there is no other excuse for publishing it.

A DICTIONARY OF CONTEMPORARY AMERICAN USAGE. By Bergen Evans and Cornelia Evans. Random House, 1957. 567 Pages; $5.95. One of the uncomfortable facts of life is that language keeps changing; what the word meant when you were in third grade isn't necessarily what it means today. This is a supplement to your dictionary, which tells meaning; this will give you the background and the usage. It belongs on your shelf between the dictionary and the thesaurus if you write anything.

THE ONE THAT GOT AWAY. By Kendal Burt and James Leasor. Random House, 1957. 292 Pages; Illustrated; $3.95. Franz von Werra made two abortive escapes from the British in England, and finally made good his departure from a train taking him to a Canadian prison camp. This is not only good adventure reading; it headlines once again the necessity for indoctrinating soldiers and airmen, even sailors, in the name-rank-service-number formula.

RUSSIA AGAINST THE KREMLIN. By Alexandre Metaxas. World Publishing Company, 1957. 189 Pages; $3.00. "They [the Russians] will never revert to capitalism . . . but they refuse to go on in the Stalin way. . . . They are seeking the elements of a new formula that will suit their new life. . . . It will be a cold revolution, not hot with its victims' blood."

The author further states: "The creation of a citizen army secures the harmony and unity of army and nation—not in the militaristic manner of drawing the nation into the army but in the democratic manner by drawing the army into the nation."

While one may not be able to agree with all of the author's assumptions and conclusions, the basic thought and methods of presentation raise challenges difficult to refute as he suggests the concept of Universal Military Training as the key to national survival.

Views of German Leaders

GERMAN REARMAMENT AND ATOMIC WAR
By Hans Speier
Row, Peterson and Company, 1957
272 pages; $5.00

Reviewed by
COL. CHARLES A. H. THOMSON, *Infantry, USAR, who is on the staff of the Brookings Institution.*

Hans Speier, head of the tactical science division of the Rand Corporation, has put together a tightly packed discussion of the views of contemporary German military and political leaders on international affairs, on the prospects and shape of war in the future, and on German rearmament. The main focus of attention is, of course, western Europe and the struggle with the Soviets. But Speier casts light on fundamentals of our foreign policy: the nature of coalitions in general, not merely the particular problems of NATO; the nature of politico-military decisions in general, and not merely the diplomatic and military aspects of cold war against the Communists. All this is within a general frame of the implications of nuclear developments.

By interview and conference, Speier sought out the views of some 120 members of the former German military class. He takes them seriously, not merely because their opinions will undoubtedly influence the policies of West Germany and thus our own freedom of action, but because he considers them men of intellectual distinction with whom it is worthwhile to discuss serious matters.

By and large, the German officers have not fully appreciated the nature and power of atomic war. This shortcoming is being remedied, but within the tradition of a great land power. The officers, in the main, are not given to moralistic judgments; they pride themselves on their realism, that permits them to judge that the United States will probably lose the cold war, or to conclude that a long war to victory will have to be waged using operational space outside Western Germany. Several of them make perfectly clear that what the United States will do with its atomic capability will depend on the way the U. S. perceives its national interest—and it may not be worthwhile to risk an atomic holocaust in New York for Düsseldorf or Frankfurt. They are spiritedly discussing the role of conventional arms in modern warfare. They do not think war will be abolished when both the United States and the Soviet Union can use intercontinental nuclear missiles against each other. Instead, the political and military importance of restricted war will grow, and the need for conventional ground forces will remain.

In his concluding section, the author examines the consequences of the "virtual nuclear bipolarity of the world . . . and the virtual American monopoly of nuclear power in NATO." He also shows how the effects of that bipolarity might be mitigated by sharing of nuclear capabilities, and sets forth a general theory of coalitions within which such shared capabilities can be appraised. At the end, he points to the paradox at the heart of NATO: the fact that the very power that protects the coalition is the power the members of the coalition fear. That fear will be downed, and the paradox overcome, not by any acceptance of tactical nuclear weapons as "conventional," but by a "realistic understanding of the nature of war, of the stakes for which it would be necessary to fight it, and of the measures that must be taken to increase the likelihood of moral and physical survival."

Now that moral, for sure, does not apply solely to NATO. It applies to our whole politico-military framework. It underlies our chance for freedom and dignity in the world.

Speier's discussion of these fundamentals does much to permit better understanding of the politico-military actions of our national leaders. These leaders cannot always be our teachers; they have to act. Therefore we must turn for insight to the fully informed analysis of a thoughtful scholar. Speier has given us better understanding of German politicians and of soldiers; but more than that he helps us to understand the baffling politico-military problems of arms and diplomacy, war and peace, in a nuclear-powered world.

The Navy's Part

HISTORY OF UNITED STATES NAVAL OPERATIONS IN WORLD WAR II.
Volume XI: The Invasion of France and Germany: 1944-1945
By Samuel Eliot Morison
Atlantic-Little, Brown & Company, 1957
360 pages; Illustrated; Maps; Index; $6.50

Reviewed by
COL. ROBERT F. COCKLIN, *Artillery, USAR, who is Advertising Director of* ARMY.

With the publication of this book, Samuel Eliot Morison has turned out eleven volumes with some 4,046 pages of text, on the history of U. S. naval operations in World War II. With three more volumes scheduled to complete the series, his total output will undoubtedly surpass five thousand pages. This may be some measure of the magnitude of the task which he undertook during the war, but more amazing still is the sustained excellence of each volume.

As the title indicates, this volume describes the final phases of the war in Europe in so far as the Navy took an active part. It covers the Normandy invasion, the landings in southern France, and several other naval activities including the use of landing craft to ferry elements of the Army across the Rhine.

Despite the high quality of Morison's writing, this book is somewhat of a disappointment. The Normandy invasion, which surely must be considered the greatest amphibious operation in the history of warfare, never quite comes alive in this telling. To be sure, it is a tremendous operation to describe in the compressed space allotted to it, and many of the details and highlights are already well known from the excellent U. S. Army histories on the subject as well as the memoirs of many of the leading participants.

Nevertheless, Morison fails to impart to the reader the full magnitude of the operation. Nor does he capture the sheer desperation which confronted the landings on Omaha Beach for most of the first day, a situation so perilous that General Bradley gave serious consideration to re-routing his follow-up forces to Utah and the British beaches. Similarly, Morison's account minimizes other difficulties and shortcomings which accompanied the initial breaching of Fortress Europe. The fire and color which enlivened his accounts of the naval war in the Pacific were seemingly dampened in this instance by the Channel mists.

On the other hand, Morison waxes somewhat ecstatic in his appraisal of the landings in southern France. In Morison's book, this was "the almost perfect amphibious operation."

Operation Anvil-Dragoon, which put three U.S. divisions and some French forces ashore in Provence, had a difficult birth. It was strongly opposed by Winston Churchill and some of the other British high command but largely at Eisenhower's insistence it finally was launched on 14-15 August 1944. Morison attributes a major part of the success of this operation to the fact that "the Army allowed the Navy to lay-on an extended pre-landing bombardment and to land the assault waves in daylight. The aviators cooperated perfectly." Without refuting the author's estimate of the general excellence of the actual operation, he does overestimate its strategic importance.

As in his previous volumes, Morison makes fine use of the odd vignette to brighten the story just when the reader is about to be submerged in the drabness

of enormity which any account of warfare on this scale imparts. Morison's evident pride in the splendid accomplishments of the United States Navy has sustained his efforts in this monumental history at a high level. The result is rewarding to all who are interested in military history.

The Civil War in Photographs

THE PHOTOGRAPHIC HISTORY OF THE CIVIL WAR
Edited by Francis Trevelyan Miller
Thomas Yoseloff, 1957
Ten volumes in five; $40.00

Reviewed by
N. J. ANTHONY, *an Associate Editor of* ARMY, *who is at work on a volume dealing with the Civil War.*

Civil War scholars are indebted to this publisher, who revived *Battles and Leaders* early this year, for having resurrected this magnificent collection of photographs, first published in 1911 to commemorate the war's semicentennial. The 1911 edition quickly sold out, and up to now used sets could be obtained only at fantastic prices. This edition, from the original plates, is complete even to gingerbread trimming around each type page, as was the fashion. Some saving is passed on to the purchaser by offset printing and by binding what were originally ten volumes into five hefty ones, at a price not exorbitant considering today's printing costs. The texture of some photographs is a little muddy due to the paper, but no picture suffers to the extent that details are entirely lost.

Coverage is as complete as it possibly could be, with selections from the work of Brady, Gardner, O'Sullivan, Cooley, and others less well known, including the Confederate Lytle who sneaked shots of Yankees at drill right under their noses. Of course, no action scenes are included, for the day of the speed shutter and the long-distance lens had not arrived. The wonder is that these hardy souls turned out work of such quality under the field conditions of the time. Tagging after the troops with their "what-is-it" wagons which doubled as darkrooms, they assembled and disassembled ponderous cameras and tripods, handled easily broken glass plates, and nursed stocks of scarce chemicals that could be obtained (by Confederates too) only from New York. The almost four thousand pictures in the set's more than 3,500 pages cover scenes of infantry after action, artillery, cavalry, camp life, training, fortifications, railroads, warships, the savagery of the conflict, portraits of individuals and poses by unit groups.

This is more than a collection of pictures of the second war to be photographed (the Crimean War was first). Reviewers overlook the text which occupies about half the space. It is not patterned after *Battles and Leaders*, where the text is by the contending leaders and all illustrations are line drawings. The first three volumes relate the actions and effects of all the important battles; the next six deal with the cavalry—whom Bell I. Wiley elsewhere labeled the Wild Blue Yonder Boys of the day—forts and artillery, the navies, prisons and hospitals, soldier life and the intelligence services, songs, poetry and eloquence. The final volume gives complete histories of field armies and corps and biographical notes on hundreds of leaders. There is a fine foreword by Henry Steele Commager.

How Not to do It

THE RED FORT: The Story of the Indian Mutiny, 1857
By James Leasor
Reynal & Company, 1957
383 Pages; Illustrated; Index; $5.00

Reviewed by
COL. S. LEGREE, *the pseudonym of a USAR Artilleryman who has contributed many reviews.*

The subtitle, "The Story of the Indian Mutiny, 1857" is most misleading, since this is not *the* story by an ICBM's range, but as *a* story it will do nicely. The Red Fort was in Delhi, and this is basically the story of the British siege of Delhi and the Fort—but it doesn't tell much about the Mutiny in other parts of India. Even worse, it is predicated on too much prior knowledge by the reader.

Now that we have disposed of the complaints, we can say that as a study of how not to run a colony, a business enterprise, an army, an officer corps, a siege and a battle, it has no peer. Mr. Leasor's research was thorough and the more he researched the more incredible appears England's and the East India Company's mismanagement of India and all that pertained to it.

Imagine, if you can, an army recruited and paid by a commercial corporation, stiffened by a small proportion of Queen's formations, officered by Queen's commissioned men and Company commissioned men, and using a large proportion of suspect native troops. Add to the possibilities that this situation could engender, the fact that the senior officers were uniformly old, usually physically unable to perform their tasks, and in some key cases, senile. Compound all this with an almost universal ignorance of elementary sanitary measures, Indian summer heat, and an apparent indifference to the health, or even the feeding, of enlisted men.

The mutineers, safely behind the walls of Delhi and the Fort, had about a ten-to-one preponderance of numbers, unlimited ammunition, and many more guns.

The fact that the walls were breached and the Red Fort taken redounds to the credit of a very few officers who had the force, persistence and courage to compel the more senior officers into reluctant action, and to the junior officers and enlisted men who never heard of unacceptable-loss ratios, and who took death from disease and enemy fire in stride. We read of formations standing in the open, accepting enemy fire for more than an hour, without taking evasive action or returning fire—because there were no orders. Poor co-ordination, worse reconnaissance, nonexistent logistical arrangements, an impossible command structure—everything was missing but raw courage, and courage won the battle.

Never had so many mistakes been made by so many; this is a how-not-to-do-it book of a high order.

Income versus Outgo

PRINCIPLES OF PERSONAL FINANCE FOR SERVICE PERSONNEL
By Associates in the Social Sciences, Department of Social Sciences, U. S. Military Academy
Military Service Publishing Company, 1957
469 Pages; Illustrated; Index; $2.00

Reviewed by
BRIG. GEN. DONALD ARMSTRONG, *USA, Retired, former Commandant of the Industrial College of the Armed Forces who has written many articles and reviews for* ARMY.

In the war of attrition every serviceman is constantly waging between his income and his outgo, a financial estimate of the situation is as useful for victory as its counterpart in a tactical operation. This book provides the information he needs to make such an estimate. In it are all the necessary data for calculating his present and future resources from pay and allowances. Less palatable reading follows in an analysis of the federal and state income taxes that take the first bite out of his pay check. When the reader discovers that the next chapter deals with borrowing money, he may feel that the authors were well advised in placing this chapter on Credit right after the bad news on taxes. The analysis of this subject, however, is highly constructive, as is all the book, in offering many valuable suggestions for solving the financial problems of the serviceman.

Managing one's financial affairs means careful planning. The chapter on controlling spending habits may not stop the spendthrift, but it is useful reading for the household bent on profiting from the experience of others in the expenditure of limited funds. Subsequent chapters describe the services a bank can render, the relative merits of owning or renting a home, how to save and invest any surplus, and the use of a family budget. An appendix advises readers on ways of avoiding legal difficulties in financial matters.

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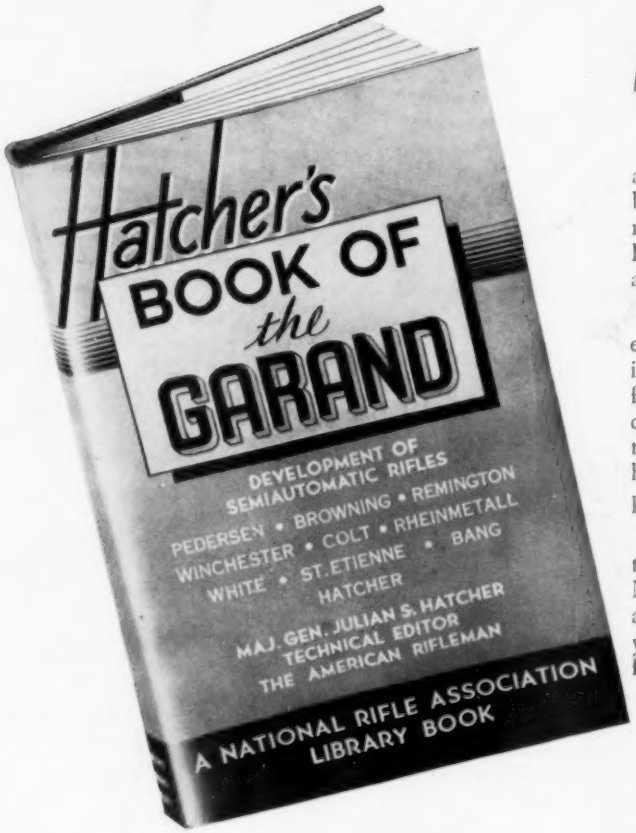

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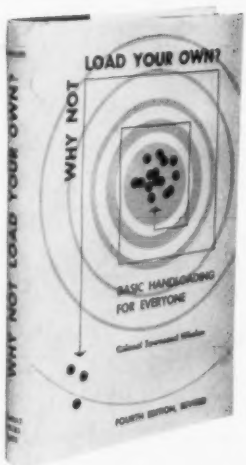

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